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Safety Measures in a Tuberculosis Laboratory

Tuberculosis Mortality in the United States, 1948



FEDERAL SECURITY AGENCY

PUBLIC HEALTH SERVICE

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# Public Health Reports

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## —Editorial—

### Protection for the Laboratory Worker

Over the past few years it has become increasingly evident that bacteriologists who work in diagnostic and research laboratories are exposed to hazards of infection far beyond those met in ordinary living. Such studies as the one by Sulkin and Pike (1) on viral infections contracted in laboratories give us an estimate of the unseen and frequently unrecognized dangers present in the laboratory. Of the 222 cases of laboratory infection reported in that study, only 27 were due to known accidents. The fact that danger in the laboratory is not confined to the observable accident is borne out by research which has been done at Camp Detrick, Md. (2). By using sieve type air samplers, placed at appropriate distances around the laboratory working area, the investigators at Camp Detrick were able to determine that bacterial aerosols were released during such common laboratory operations as the removal of stoppers from dilution bottles, removal of wet plugs from broth culture tubes, and removal of an inoculum from a vaccine bottle with a hypodermic syringe. The production of bacterial aerosols by pipetting, pouring, and vigorous agitation of dilution blanks was further shown by means of high-speed photography in a study by Johansson and Ferris (3), also at Camp Detrick.

The conclusion that we can draw from these studies, in relation to the tuberculosis laboratory, presents us with a grave problem in safeguarding the worker. It would be inconsistent with our concern for the health of all people to take an attitude of resignation about the contraction of tuberculosis by workers in laboratories. We must not take it for granted that scientists will inevitably be infected by the materials with which they work. If the probability exists, greater efforts should be made to remove it.

Since the risks following exposure to tubercle bacilli depend a great

This is the fiftieth of a series of special issues of PUBLIC HEALTH REPORTS devoted exclusively to tuberculosis control, which appear in the first week of each month. The series began with the Mar. 1, 1946, issue. The articles in these special issues are reprinted as extracts from the PUBLIC HEALTH REPORTS. Effective with the July 5, 1946, issue, these extracts may be purchased from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., for 10 cents a single copy. Subscriptions are obtainable at \$1.00 per year; \$1.25 foreign.

deal upon the inoculum size, it seems important to stress the fact that the use of techniques which avoid heavy exposure will undoubtedly reduce the incidence of laboratory infection.

Laboratory technicians and investigators in sanatoria in the past were usually former patients who had a certain amount of protection from their arrested disease. Since laboratories in health departments and research centers are increasingly drawing their personnel from the general public, the risk is now greater. While our information on the incidence of laboratory infections is too meager to have great validity, individual instances of tuberculosis contracted in laboratories which employ nontuberculous personnel are known in sufficient number to cause concern. Much evidence indicates that tuberculin-negative individuals should not handle virulent organisms. It has been shown repeatedly that adults with naturally acquired tuberculin sensitivity develop fewer cases of clinical tuberculosis than those who have not previously overcome an infection. It would therefore be desirable to select tuberculosis laboratory workers, when possible, from tuberculin-positive individuals, assuming this sensitivity state to be associated with at least some degree of immunity. This procedure may not always be feasible, however, inasmuch as the proportion of tuberculin-positive reactors in the technicians' age group today is relatively low. For tuberculin-negative workers especially, an active immunizing agent is needed. Since BCG vaccine is the most promising agent today, as it becomes available advantage may be taken of whatever protection it affords.

Dr. Arnold G. Wedum, the Safety Director of the Biological Department, Army Chemical Corps, at Camp Detrick, considers that the most important single item in a laboratory safety program is the provision of adequate bacteriological transfer cabinets, properly equipped with ventilating devices so that aerosols will be swept away. The design of such hoods is a matter of great importance, since improperly designed hoods hinder laboratory operations. Extensive work on developing this kind of equipment has been carried out in a number of laboratories, at Camp Detrick, at the National Institutes of Health, at Notre Dame University, and during the war in Naval Research Unit No. 1 at Berkeley, Calif.

This issue of PUBLIC HEALTH REPORTS includes a paper which describes the safety procedures practiced at the tuberculosis laboratory of the Communicable Disease Center. No one laboratory has all the answers to questions of protection; exchange of ideas on the subject should be profitable to all.

There is little excuse for saying that we do not know how to provide proper equipment. We do not have conclusive information about protection, but it is certain that careful and complete use of what we do know will reduce the risks.



The question of cost is sure to arise. Proper laboratory equipment is expensive. Proper care slows down procedures. Undoubtedly the laboratory where all possible measures are taken to minimize hazards will spend considerably more for the same operations than the laboratory which sacrifices safety to economy. But those who are concerned with the control of tuberculosis know too well the ultimate costs of every case to need to argue such a point. Even if we were to proceed on the basis of economy alone, without regard for other values, the use of every possible safety measure would still be warranted. The values, however, which concern the well-being of individuals and of the community are those which decide our final aims. We must not overlook this important step in protecting those values.

ROBT. J. ANDERSON, *Medical Director,*  
*Chief, Division of Tuberculosis.*

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- (3) Johansson, K. R. and Ferris, D. H.: Photography of airborne particles during bacteriological plating. *J. Infect. Dis.* **78**: 238-252 (1946).

## Safety Measures in a Tuberculosis Laboratory

By CHARLES H. FISH, M. D., and GEORGE A. SPENDLOVE, M. D.\*

With the increasing use of cultural methods and animal inoculations in the laboratory diagnosis of tuberculosis, the hazards of accidental infection among laboratory workers are becoming a matter of constantly greater concern to laboratory directors. In the Tuberculosis Laboratory Unit, Communicable Disease Center, Public Health Service, certain safety procedures have been formulated which are presented here with the full realization that they are empirical and not in any way conclusive. There is great need for scientific study of the whole problem of safety in the laboratory. It is hoped, however, that this may serve as a check list for use by other laboratories in evaluating safety measures now in use and in considering possible improvements.

1. Thorough instruction is given in (1) aseptic technique; (2) methods of handling specimens, cultures, and animals; (3) methods of avoiding contamination of self, others, and surroundings; and (4) methods of decontamination of self and surroundings.

2. An exhaust hood equipped with ultra-violet light, exhaust fan, and sterilizer, is provided for transfer of cultures. Ultraviolet light in the hood is turned on for 10 minutes before and after transfer of cultures.

3. Medical and health program:

- (a) Physical examination, including chest X-ray, is required before employment.

- (b) Tuberculin tests are done on all personnel.<sup>1</sup>

- (c) Chest X-rays are required every 3 months.

- (d) It is emphasized that fatigue, emotional stress, and malnutrition act as contributory factors to the development of tuberculosis after exposure.

- (e) Illnesses are reported immediately.

- (f) Accidents are reported immediately.

- (g) Fifteen-minute rest periods are allotted in morning and afternoon.

4. Use of equipment:

- (a) The use of mouth pipettes in contaminated rooms is prohibited.

- (b) Sterile masks are worn during transfer of cultures. Masks are disposed of as contaminated material after use.

\*Surgeon, acting in charge of the Tuberculosis Laboratory Unit, Communicable Disease Center, and Tuberculosis Control Officer, Utah State Department of Health (formerly with CDC), respectively.

<sup>1</sup> This laboratory is one in which the applicability of BCG is being studied. Nonreactors to tuberculin are vaccinated with BCG when they begin work in the laboratory.

(c) Rubber gloves, masks, and goggles are worn while doing animal inoculations and autopsies.

(d) Grinding of dry pathogenic mycobacteria in an open container is prohibited.

(e) Needles and syringes are checked for defects before use. Only "Luer-Lok" syringes are used for animal inoculations.

5. Handling of animals:

(a) Animals are autopsied on metal trays to prevent contamination of tables.

(b) Animal inoculations and autopsies are done behind a plexi-glass screen for protection against accidental contamination of clothing.

(c) Discarded autopsied animals are wrapped in wax paper and incinerated.

6. Rooms where specimens are received, cultures transferred, infected animals are housed, and where animals are inoculated and autopsied, are considered contaminated, as are the outsides of containers of specimens, needles, syringes, metal trays, and all objects used in the transfer of cultures.

7. Decontamination procedures:

(a) Needles, syringes, and metal trays are autoclaved before washing. Instruments are boiled before washing. Large equipment and stationary objects, if contaminated, are kept in contact with 5 percent saponated cresol for 30 minutes. Infected material is discarded in a splash-proof can.

(b) Floors are swept with a dust reducing compound and mopped daily with hot soapy water containing 5 percent cresol.

(c) Table tops are swabbed daily, after work, with 5 percent saponated cresol or with 70 percent alcohol.

8. Personal procedures:

(a) Short sleeved laboratory coats are worn in contaminated rooms.

(b) Laboratory coats are removed before leaving contaminated rooms.

(c) Contaminated hands are washed for 2 minutes with soap and water, rinsed with 70 percent alcohol, and allowed to dry in air. (70 percent alcohol dispensers are situated in convenient locations.)

9. Miscellaneous:

(a) Safety signs (NO SMOKING, CONTAMINATED AREA, REPORT ACCIDENTS IMMEDIATELY) are situated in easily discernible locations.

(b) No smoking is allowed in contaminated rooms.

(c) Laboratory rooms are draft free, air-conditioned, and adequately lighted.

(d) Adequate rest-room facilities are provided.

(e) Shower facilities are provided for those personnel handling infected animals and cleaning infected animal cages.

(f) First-aid kits and fire extinguishers are easily available and are inspected periodically.

(g) Care is taken to avoid skin contact with cresols and streptomycin in order to avert sensitivities.

# Tuberculosis Mortality in the United States, 1948

By LILLIAN GURALNICK and STANLEY GLASER\*

An increasing rate of decline in tuberculosis mortality in the United States has been recorded in each of the years since the close of the war. In 1948, there were 43,833 deaths from tuberculosis (all forms) representing a mortality rate of 30.0 per 100,000 estimated midyear population, which was 10 percent below the rate of 33.5 recorded in 1947. The 1947 rate was 7 percent below that for 1946 which, in turn, was 5 percent lower than the rate for 1945.<sup>1</sup> On the basis of a 10-percent sample of death certificates, the 1949 rate is expected to be 10-percent less than that for 1948.

This paper, the seventh in a series of annual reports (1-6), presents data on the number of deaths and on death rates for tuberculosis in the United States and in each State for 1948, together with comparable data for 1947 and the prewar period, 1939-41. The trend of the death rate for respiratory tuberculosis by age is discussed for the 21-year period, 1928-48.

A true measure of the changes in the nature of the tuberculosis problem cannot be obtained from mortality data alone. Knowledge of the incidence, prevalence, and case fatality rates is especially important in understanding the epidemiology of this chronic disease. In the absence of more complete data, the varying reductions in the mortality from tuberculosis in different areas and population groups can serve as a guide to further investigation.

## Trend in the Death Rate

The rates in table 1 show a steady decline in tuberculosis mortality since 1910, the first year for which these data are available by both race and sex. The downward trend of the death rate was interrupted three times during this period in 1918, 1926, and 1936. The trends of the rates for the white and nonwhite population are roughly parallel during this period, and since 1930, the rates for the white and nonwhite females have been lower, and have declined faster, than the rates for males in the corresponding race group.

The slower rate of decline in tuberculosis mortality for the entire population, and the apparent increase in the rates for males from 1940-1945 are a reflection of population changes rather than an indication of any increase in the risk of mortality from tuberculosis. Beginning

\*Biostatistician, National Office of Vital Statistics, and, Statistician, Division of Tuberculosis, Public Health Service, respectively.

<sup>1</sup> The rates for 1945 and 1946 are based on population including armed forces overseas.

Table 1. *Death rates for tuberculosis (all forms) by race and sex: death registration States, 1910-48*

[Rates per 100,000 estimated midyear population in each specified group]

Year	All races			White			Nonwhite		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
1948 <sup>1</sup>	30.0	39.4	20.8	24.3	33.3	15.4	78.4	92.1	65.4
1947 <sup>1</sup>	33.5	43.0	24.2	27.1	36.3	18.0	88.1	100.6	76.1
1946 <sup>1</sup>	36.4	46.2	26.9	29.8	39.2	20.6	92.3	106.2	79.2
1945 <sup>1</sup>	40.1	53.0	28.6	32.7	45.1	21.7	102.6	120.9	86.5
1944 <sup>1</sup>	41.3	53.1	30.5	33.7	45.0	23.3	106.2	122.7	91.3
1943 <sup>1</sup>	42.6	52.9	32.6	34.3	44.4	24.7	112.9	126.4	100.0
1942 <sup>1</sup>	43.1	52.3	34.0	34.4	43.3	25.6	118.4	131.4	106.0
1941 <sup>1</sup>	44.5	52.5	36.5	35.4	43.3	27.4	124.2	134.3	114.5
1940 <sup>1</sup>	45.8	54.1	37.5	36.5	44.7	28.2	127.6	138.7	116.9
1939	47.1	54.0	40.1	37.7	44.7	30.6	129.1	137.3	121.1
1938	49.1	56.0	42.1	39.1	46.2	31.9	136.8	144.0	129.8
1937	53.8	61.3	46.2	43.4	50.9	35.8	145.0	155.0	135.2
1936	55.9	63.4	48.2	45.0	52.2	37.6	151.6	163.9	139.6
1935	55.1	62.1	47.9	44.9	51.7	37.8	145.1	155.4	135.0
1934	56.7	63.1	50.1	46.2	52.7	39.6	148.8	156.9	140.8
1933	59.6	65.4	53.7	48.5	54.3	42.6	157.7	165.6	149.9
1932	62.5	68.0	56.8	50.2	55.9	44.4	173.5	179.5	167.5
1931	67.8	73.5	62.0	54.2	60.1	48.2	191.1	197.4	184.9
1930	71.1	76.2	65.9	57.7	63.4	51.9	192.0	194.3	189.8
1929	75.3	79.3	71.3	62.4	67.1	57.6	192.0	191.5	192.6
1928	78.3	82.5	74.1	64.9	69.7	59.9	199.5	199.4	199.6
1927	79.6	82.9	76.1	66.5	70.7	62.2	208.7	205.4	212.1
1926	85.5	89.1	81.7	72.0	76.4	67.5	223.8	221.5	226.1
1925	84.8	88.0	81.4	71.6	75.8	67.2	221.3	215.8	226.7
1924	87.9	91.5	84.3	74.9	79.3	70.4	218.6	215.0	222.3
1923	91.7	95.4	87.9	79.5	84.4	74.5	213.1	206.3	220.0
1922	95.3	99.5	91.0	82.6	87.5	77.4	218.9	216.6	221.2
1921	97.6	101.1	94.1	84.7	89.1	80.2	239.3	233.7	245.1
1920	113.1	116.6	109.5	99.5	104.1	94.8	262.4	255.4	269.6
1919	125.6	134.2	116.9	110.9	121.1	100.4	284.0	275.5	292.7
1918	149.8	167.7	131.8	134.3	153.2	115.4	346.0	351.0	340.9
1917	143.5	158.7	127.7	129.6	-----	-----	332.6	-----	-----
1916	138.4	152.9	123.3	125.7	141.3	109.5	322.7	322.3	323.0
1915	140.1	155.9	123.5	128.5	144.0	112.2	401.1	420.2	380.5
1914	141.7	158.5	123.9	130.3	146.9	112.9	396.7	417.8	374.0
1913	143.5	158.7	127.4	132.6	147.7	116.7	386.5	401.9	369.9
1912	145.4	159.3	130.7	136.0	149.4	121.8	429.0	459.9	394.5
1911	155.1	168.2	141.3	145.0	157.5	131.9	461.4	484.8	435.2
1910	153.8	167.1	139.8	145.9	158.2	132.8	445.5	479.3	406.8

<sup>1</sup> Excludes deaths among armed forces overseas. Rates based on population excluding armed forces overseas

Note.—The death registration States increased in number from 20 States and the District of Columbia in 1910 to the entire continental United States in 1933.

with 1940, the tuberculosis death rates shown in table 1 are computed for the population present in the country, and do not include members of the armed forces overseas or deaths occurring in the overseas population. Rates computed on such a basis are not entirely satisfactory for a chronic disease. In the case of tuberculosis, most deaths occurred in this country since the armed forces were screened for tuberculosis on entry into service, and those who became ill overseas were presumably returned to this country for hospitalization. Consequently, the tuberculosis death rates computed only for the population present in the country overstate mortality risks for the war years in comparison with those for the prewar or postwar years, particularly for men of military age.

For tuberculosis, a more comparable measure of risk for the war years is provided by rates computed for the entire population, whether in this country or overseas, including the deaths among the armed

forces overseas. However, the number of deaths overseas has been comparatively small, not exceeding 155 or 0.3 percent of the total tuberculosis deaths in any year, so that little difference is made in the rate by their inclusion or omission. Since the data are not readily available by age at death, it has been found more convenient to omit the overseas deaths in this report. An approximation of these rates for the total population, obtained by relating the tuberculosis deaths occurring in this country to the population, including the armed forces overseas, is presented below. These figures have been used to plot the points for 1940-48 in figure 1.

Year	Rates based on population including armed forces overseas			
	Total	Total male	White male	Nonwhite male
1948.....	29.9	39.1	33.1	91.6
1947.....	33.4	42.6	36.0	90.9
1946.....	36.0	45.3	38.5	104.6
1945.....	37.9	47.3	40.1	110.3
1944.....	39.6	48.8	41.3	115.4
1943.....	41.8	50.9	42.6	124.6
1942.....	42.8	51.6	42.7	130.8
1941.....	44.5	52.4	43.2	134.3
1940.....	45.8	54.1	44.7	138.7

Figure 1 shows the trend of the total rate for tuberculosis for the United States from 1910 to 1948, and of the rates for the four race-sex groups. The decline in mortality rates for white males was retarded during the war years, but there was no actual rise in the rates. For the postwar years, the increased rate of fall which is conspicuous in the trend line for the total population can be observed as well in the rates for white males, beginning with 1944, and for white females beginning with 1947. For the nonwhite population, 1948 is the first postwar year showing an increased rate of decline.

The varying rates of decline for the four race-sex groups have altered the race and sex differentials in tuberculosis mortality since 1910. Considering the rate for white males for each year as a base, the ratio of the rates for the other race-sex groups to that for white males is shown below for several selected years.

Year	White		Nonwhite	
	Male	Female	Male	Female
1910.....	100	84	303	257
1933.....	100	78	305	276
1940.....	100	63	310	262
1948.....	100	47	277	198

The greater rate with which mortality for white females has declined is emphasized by these ratios. It is also interesting to note, that, while the rates for both whites and nonwhites descended rapidly, only



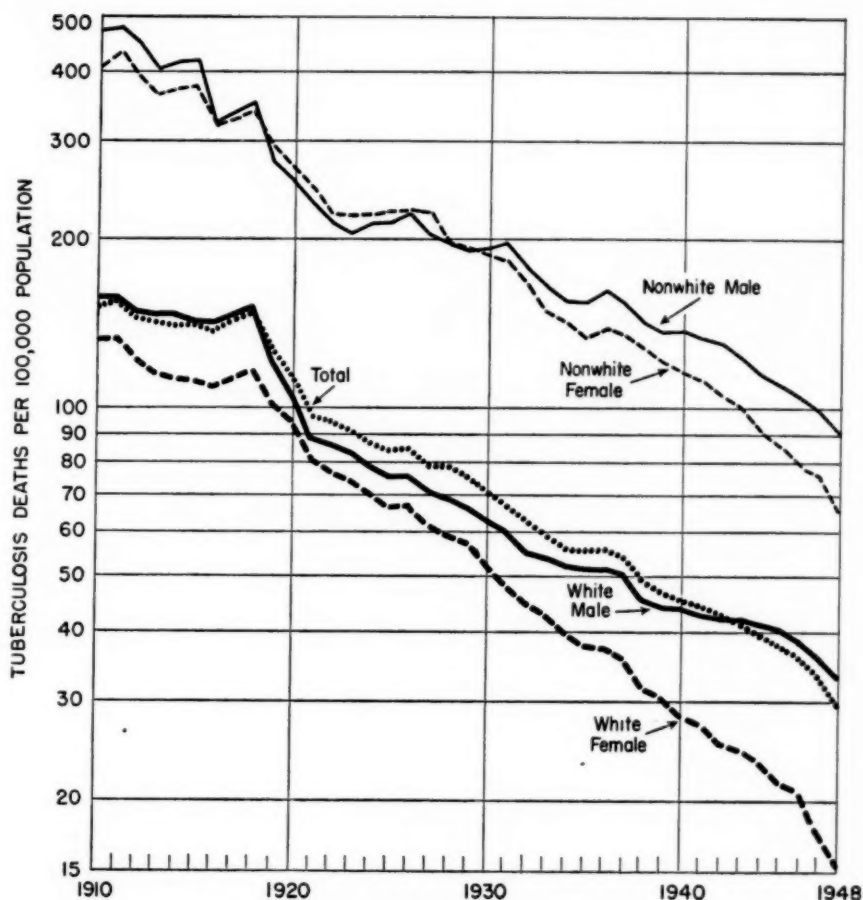


Figure 1. Death rates for tuberculosis (all forms), by race and sex: death registration States, 1910-1948. (The rates for 1940-48 are computed from deaths excluding those among the armed forces overseas, and population including the armed forces overseas.)

in the past decade is there any indication that the gap in the rates between the race groups is growing narrower.

### Respiratory Tuberculosis: Mortality by Age, Race, and Sex

The change in the pattern of the age-specific death rates for respiratory tuberculosis has been the most prominent feature of mortality from this disease in the past 21 years. As a result of the more rapid decline in the rates at the younger ages, tuberculosis has changed from a disease whose greatest toll was among young adults, to one for which the death rate increases with increasing age.

In 1948, the curve of the age-specific death rates for nonwhite females (fig. 2) is the only one in the four race-sex series showing a



Table 2. *Number of deaths and death rates for tuberculosis (all forms), by age, race and sex: United States, 1939-41 average, 1947 and 1948*  
 [Exclusive of deaths among armed forces overseas. Rates per 100,000 estimated midyear population in each specified group, excluding armed forces overseas]

Race, sex, and year	NUMBER														Not stated
	All ages	Under 5 years	5-9 years	10-14 years	15-19 years	20-24 years	25-29 years	30-34 years	35-44 years	45-54 years	55-64 years	65-74 years	75-84 years	85 years and over	
All races, both sexes:															
1948.....	43,833	1,138	216	282	1,190	2,743	3,226	3,365	7,573	8,165	7,737	5,545	2,286	337	30
1947.....	48,064	1,099	226	373	1,720	3,612	3,866	3,801	8,314	8,868	7,969	5,586	2,236	308	29
1939-41.....	60,429	1,613	475	799	3,388	6,719	6,236	5,811	10,846	10,373	7,960	5,104	1,815	236	53
Male:															
1948.....	28,552	594	106	103	427	1,099	1,425	1,779	4,831	6,360	6,169	3,971	1,474	192	17
1947.....	30,585	579	107	148	637	1,440	1,685	1,919	5,338	6,845	6,377	3,974	1,359	163	19
1939-41.....	35,433	831	251	306	1,234	2,306	2,782	3,038	6,803	7,650	5,786	3,308	989	119	30
Female:															
1948.....	15,281	544	110	179	763	1,644	1,801	1,586	2,742	1,805	1,568	1,571	812	145	11
1947.....	17,479	520	119	225	1,083	2,172	2,211	1,882	2,976	2,020	1,622	1,615	877	145	12
1939-41.....	24,996	782	224	493	2,154	3,413	3,434	2,773	4,043	2,723	2,174	1,766	826	117	23
White, both sexes:															
1948.....	31,750	728	134	131	496	1,315	1,759	2,077	5,126	6,194	6,469	4,893	2,106	304	18
1947.....	34,783	724	122	150	704	1,795	2,209	2,406	6,778	6,726	6,823	4,947	2,044	277	18
1939-41.....	43,282	1,014	265	372	1,617	3,180	3,828	3,827	7,605	8,183	6,865	4,596	1,693	211	28
Male:															
1948.....	21,616	375	51	51	191	529	797	1,123	3,326	4,926	5,206	3,501	1,343	171	11
1947.....	23,167	377	57	63	296	717	988	1,206	3,752	5,314	5,491	3,531	1,222	143	10
1939-41.....	26,350	520	141	152	589	1,239	1,690	2,000	4,848	6,143	5,042	2,955	1,908	105	19
Female:															
1948.....	10,134	353	68	80	305	786	962	954	1,800	1,268	1,263	1,392	703	133	7
1947.....	11,616	347	65	87	468	1,078	1,221	1,200	2,026	1,412	1,332	1,416	822	134	8
1939-41.....	16,932	494	124	220	1,028	1,941	2,138	1,827	2,757	2,040	1,823	1,641	785	106	9
Nonwhite, both sexes:															
1948.....	12,083	410	82	151	694	1,428	1,467	1,288	2,447	1,971	1,268	652	180	33	12
1947.....	13,281	375	104	223	956	1,817	1,687	1,395	2,536	2,139	1,176	639	192	31	11
1939-41.....	17,147	599	210	427	1,771	2,539	2,408	1,984	3,241	2,190	1,095	508	123	26	25
Male:															
1948.....	6,936	219	40	52	236	570	628	656	1,505	1,434	963	473	131	21	8
1947.....	7,418	202	50	85	341	723	697	713	1,586	1,531	886	440	137	20	7
1939-41.....	9,083	311	110	154	645	1,067	1,092	1,038	1,955	1,507	744	353	81	15	11
Female:															
1948.....	5,147	191	42	99	458	858	839	632	942	537	305	179	49	12	4
1947.....	5,863	173	54	138	615	1,094	990	608	2,900	608	290	199	55	11	4
1939-41.....	8,064	288	100	273	1,126	1,472	1,316	946	1,286	683	351	155	42	11	14

## RATE

All races, both sexes:		7.5	1.7	2.6	10.9	23.1	27.1	30.1	37.1	48.0	59.2	74.0	76.1	75.6
1948.....	30.0	7.5	1.7	2.6	10.9	23.1	27.1	30.1	37.1	48.0	59.2	74.0	76.1	75.6
1947.....	33.5	7.6	1.9	3.5	15.6	30.3	33.3	34.2	41.4	52.8	62.8	76.2	77.6	70.2
1946.....	45.8	15.2	4.4	6.8	27.5	49.2	56.2	56.5	58.9	66.8	74.7	80.4	79.7	63.2
1939-41.....														
Male:														
1948.....	39.4	7.7	1.6	1.9	7.8	18.8	24.6	32.9	48.2	75.3	94.2	109.5	106.5	100.5
1947.....	43.0	7.8	1.7	2.7	11.7	24.7	29.7	35.6	54.0	81.8	99.4	111.5	101.8	86.7
1946.....	53.5	16.4	4.6	5.2	20.0	40.5	51.1	59.7	73.8	96.1	106.1	105.0	91.4	74.3
1939-41.....														
Female:														
1948.....	20.8	7.4	1.7	3.3	14.1	27.3	29.4	27.4	26.4	21.1	24.0	40.7	50.1	56.9
1947.....	24.2	7.3	2.0	4.3	19.5	35.7	36.6	32.8	29.2	24.0	25.6	42.8	56.7	57.8
1946.....	38.0	14.9	4.2	8.6	35.1	57.7	61.1	53.4	43.9	36.0	41.8	56.2	69.1	54.8
1939-41.....														
White, both sexes:														
1948.....	24.3	5.5	1.2	1.4	5.2	12.5	16.5	20.7	27.9	40.1	53.4	69.9	75.1	77.7
1947.....	27.1	5.6	1.1	1.6	7.9	17.0	21.1	24.2	32.0	44.0	57.7	72.2	76.0	71.2
1946.....	36.5	10.9	2.8	3.6	14.8	30.7	38.7	41.4	46.0	57.6	69.4	77.7	79.0	62.8
1939-41.....														
Male:														
1948.....	33.3	5.5	1.2	1.1	4.0	10.2	15.4	23.1	36.7	64.1	85.8	103.7	104.4	101.2
1947.....	36.3	5.7	1.1	1.3	6.2	13.8	19.4	24.9	42.0	69.7	92.4	106.6	98.3	85.1
1946.....	44.2	11.0	3.0	2.9	10.7	24.2	34.6	43.6	58.4	84.3	99.9	101.0	86.3	72.7
1939-41.....														
Female:														
1948.....	15.4	5.5	1.2	1.7	6.4	14.8	17.7	18.5	19.3	16.3	20.9	38.4	50.3	59.9
1947.....	18.0	5.8	1.2	1.6	9.6	20.0	22.7	23.5	22.1	18.5	22.6	40.0	56.8	60.6
1946.....	25.7	10.8	2.7	4.3	18.9	37.0	42.7	39.3	33.5	26.5	37.7	54.9	69.8	55.4
1939-41.....														
Nonwhite, both sexes:														
1948.....	78.4	22.3	4.8	10.5	51.9	105.7	114.7	109.7	120.9	125.7	133.8	133.6	89.1	60.0
1947.....	88.1	21.3	6.4	16.0	71.4	135.9	134.4	119.0	126.6	140.2	127.5	133.4	96.5	62.0
1946.....	126.9	45.1	15.3	30.8	129.2	202.2	201.5	190.8	171.9	167.7	142.5	118.6	90.9	69.2
1939-41.....														
Male:														
1948.....	92.1	23.8	4.7	7.2	35.8	86.5	103.5	121.7	157.1	188.4	199.8	187.7	135.1	95.5
1947.....	100.6	22.9	6.1	12.2	52.0	110.4	118.3	131.8	166.9	205.2	187.3	178.1	145.9	100.0
1946.....	136.7	47.2	16.1	22.3	96.7	182.3	195.4	208.1	213.4	224.7	182.2	138.4	124.4	95.3
1939-41.....														
Female:														
1948.....	65.4	20.8	5.0	13.8	67.7	124.2	124.7	99.5	88.3	66.5	65.5	75.8	46.7	36.4
1947.....	76.1	19.6	6.6	19.7	90.0	153.3	148.9	108.1	90.2	78.0	64.7	86.1	54.5	36.7
1946.....	117.5	43.1	14.5	39.2	160.0	219.6	206.9	174.9	132.7	107.5	97.0	75.5	59.8	50.4
1939-41.....														

<sup>1</sup> Includes deaths for which age was not stated.

Note: Average numbers of deaths for 1939-41 are rounded without being adjusted to group totals.

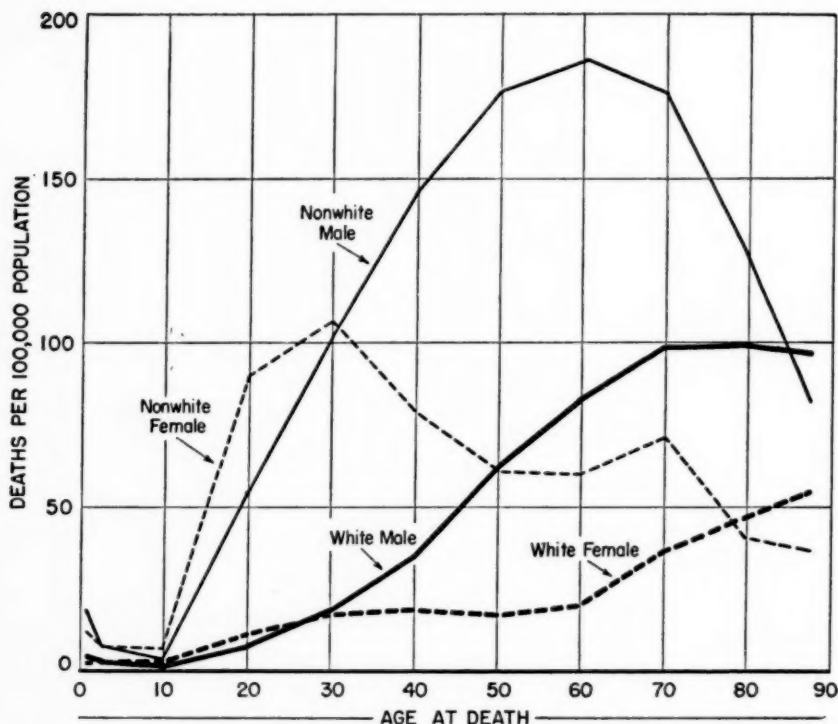


Figure 2. Death rates for respiratory tuberculosis by age, race, and sex: United States, 1948.

peak in the young adult ages. However, when the number of deaths is examined as a proportion of deaths from all causes at each age (proportionate mortality), rather than as a ratio to the population at that age (age-specific death rate), it is clear that tuberculosis is a more important cause of death in the young adult ages than in the age group over 55. The age group 15-24 in the nonwhite females, and 25-34 in the other 3 race sex-groups now represent the peaks of the proportionate mortality distribution, as shown in figure 3 for each race and sex. Respiratory tuberculosis accounts for one-third of all deaths among nonwhite females between the ages 15-24. At ages 25-34, one-quarter of the deaths of nonwhite females are due to respiratory tuberculosis; 19 percent of deaths of nonwhite males; 13 percent of the white females; and 9 percent of the white males.

The number of deaths from respiratory tuberculosis has decreased faster than deaths from all causes for the white population at practically every age in the past 21 years. In the nonwhite population, however, the ratio of deaths from tuberculosis to the total number of deaths from all causes has not dropped as much as in the white population. In fact, respiratory tuberculosis deaths of nonwhite

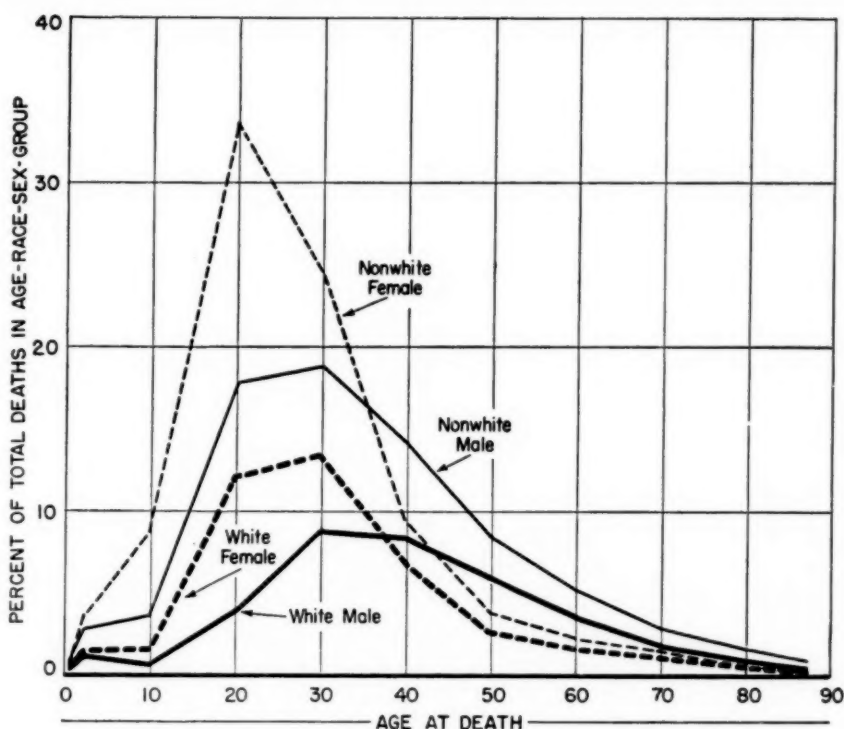


Figure 3. Deaths from respiratory tuberculosis as percentage of deaths from all causes, by age, race, and sex: United States, 1948.

females in the peak age groups form almost the same proportions of the total deaths at those ages in 1948 as were recorded in 1928. All other age groups show a small decrease. The relative decrease in the number of deaths from this cause compared to total deaths in the nonwhite males is slightly greater than that for nonwhite females through age 34. Beyond this age the decreases recorded in the proportionate mortality are very small, and in some age decades there are actually small increases.

#### *Under 15 Years of Age*

The great decline in respiratory tuberculosis mortality in the past 21 years has been shared, in widely varying degree, by almost all age groups (fig. 4). The largest percentage decrease in rates, however, has taken place among children under the age of 15. While at no time in the past 21 years has this disease been an outstanding cause of mortality among children, deaths from this cause have decreased even more than the total deaths at these ages. The death rates in 1940 and 1948 are shown below in terms of the rates for 1930, which are shown as 100 in each case.

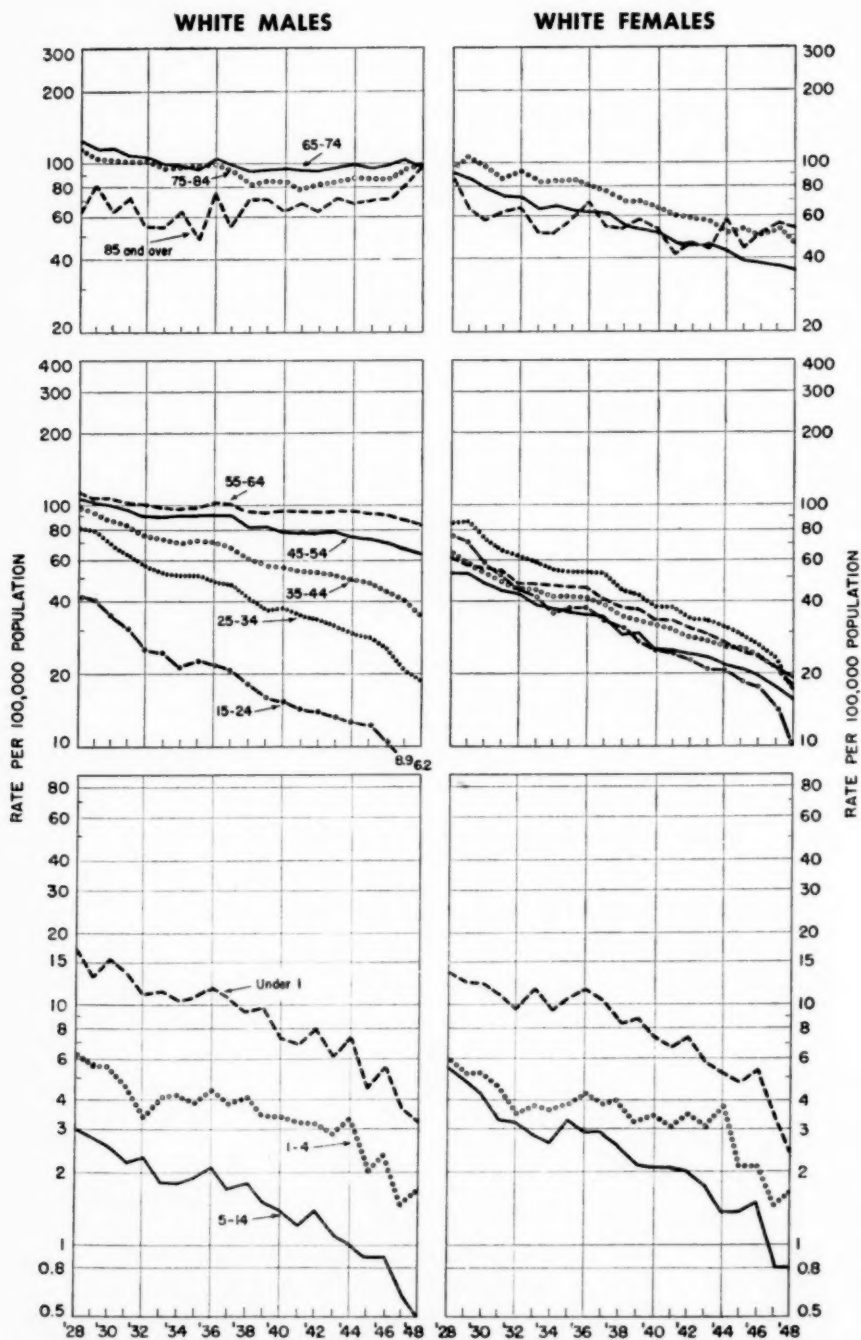


Figure 4a. Respiratory tuberculosis death rates for white males and white females by age: death registration States, 1928-48. (The rates for 1940-48 are computed from deaths, excluding those among the armed forces overseas, and population including the armed forces overseas.)

# NONWHITE MALES

# NONWHITE FEMALES

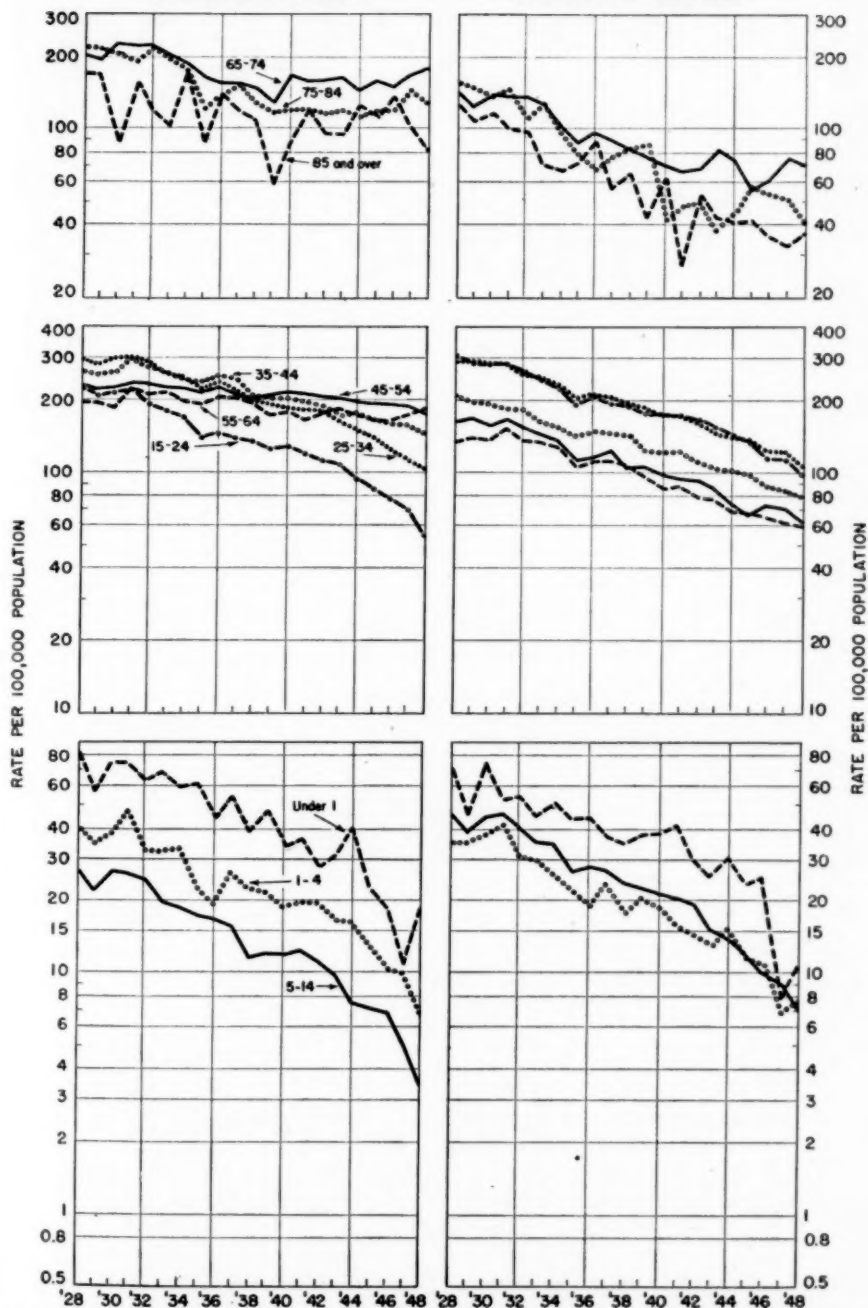


Figure 4b. Respiratory tuberculosis death rates for nonwhite males and nonwhite females by age: death registration States, 1928-48. (The rates for 1940-48 are computed from deaths, excluding those among the armed forces overseas, and population including the armed forces overseas).

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Year	Age in years					
	White male			White female		
	Under 1	1-4	5-14	Under 1	1-4	5-14
1930.....	100	100	100	100	100	100
1940.....	48	62	54	60	65	49
1948.....	21	31	19	20	31	19
Year	Nonwhite male			Nonwhite female		
	Under 1	1-4	5-14	Under 1	1-4	5-14
	Under 1	1-4	5-14	Under 1	1-4	5-14
1930.....	100	100	100	100	100	100
1940.....	45	50	45	51	50	47
1948.....	25	19	13	14	20	16

As the charts show (fig. 4), the rates for nonwhite groups under 15 years of age continue to be more than four times the rates for white groups, despite the fact that the rates for nonwhite groups have declined faster than those for the white groups (except for the males under 1 year of age).

#### *Ages 15-64*

Mortality in this broad age span is characterized by a decline in the respiratory tuberculosis rates in each of the five age decades for the four race-sex groups over the past 21 years. As shown below by the ratios of the death rates for 1948 and 1940 to the respective 1930 rates, the decline was greatest for the white females in every age group. For the males, the rate of decline in tuberculosis mortality from 1930 to 1948 decreases in each successive age group. The decline in rates also slows down for the females in the older age groups, but not to the same extent. The ratios of the 1948 rates to those for 1930 are higher in every age group for the nonwhite than they are for the white population, emphasizing again the fact that the disparity between the rates in the two race groups for the ages 15-64 has not lessened between these years.

Year	Age in years									
	White males					White females				
	15-24	25-34	35-44	45-54	55-64	15-24	25-34	35-44	45-54	55-64
1930.....	100	100	100	100	100	100	100	100	100	100
1940.....	44	53	65	79	90	43	51	58	54	69
1948.....	18	25	40	61	76	17	23	34	32	34
Year	Nonwhite males					Nonwhite females				
	15-24	25-34	35-44	45-54	55-64	15-24	25-34	35-44	45-54	55-64
	15-24	25-34	35-44	45-54	55-64	15-24	25-34	35-44	45-54	55-64
1930.....	100	100	100	100	100	100	100	100	100	100
1940.....	60	62	78	95	97	62	63	64	63	62
1948.....	25	33	55	78	100	32	37	41	39	43



## Ages 65 and Over

The trend of respiratory tuberculosis death rates among people 65 years of age and over for 1928 to 1948 contrasts sharply with the trends for all other ages. For white males over 65 the rate declined generally from 1928 to 1938, remained level in 1939 and 1940, and began to rise in 1941 with the rate of increase most rapid among males over 85. While it has been observed previously that the proportion of all deaths among persons over 65 due to respiratory tuberculosis is not large, the conspicuous change in trend should warrant exploration. The rates for nonwhite males also show a slight tendency to rise in the age groups 65-74, and 75-84. The respiratory tuberculosis death rates for white females continue their trend toward a slower decline with advancing age, seen before in the 15-64-year-olds. Among nonwhite females, there are so few deaths at ages over 65 that the rates are somewhat erratic; but again, the general trend is downward. The table below contrasts the 1940 and 1948 rate with the 1930 rate given as 100.

Year	Age in years					
	White male			White female		
	65-74	75-84	85 and over	65-74	75-84	85 and over
	1930	1940	1948	1930	1940	1948
1930	100	100	100	100	100	100
1940	86	82	102	64	67	92
1948	87	97	154	45	49	94
Year	Nonwhite male			Nonwhite female		
	65-74	75-84	85 and over	65-74	75-84	85 and over
	1930	1940	1948	1930	1940	1948
	1930	1940	1948	1930	1940	1948
1930	100	100	100	100	100	100
1940	74	58	99	51	32	55
1948	78	62	92	52	29	32

It is interesting to note that the tuberculosis death rate for men over 65 has shown a similar increase in England and Wales. The Registrar-General comments: "The lasting increase which took place in respiratory tuberculosis death-rates of men over 65, with absence of any improvement of their rate at 55-65, is in sharp contrast with what occurred amongst younger men and amongst women of all age-groups, and is a feature of the epidemiology of the disease which merits investigation." (7).

A new coding procedure (8), instituted in the United States in 1949, may lower the recorded tuberculosis death rate for white males over 65 by about 10 percent for that year. However, if this procedure were applied to data for past years, the trend of the death rate would still be in an upward direction, although the general level of the rates would be lowered.

## Respiratory and Nonrespiratory Tuberculosis

Since 1910, nonrespiratory tuberculosis deaths have shown a gradual but pronounced tendency to constitute a smaller and smaller percentage of deaths from tuberculosis. In general, the death rate for the nonrespiratory forms has declined more rapidly than has the rate for respiratory tuberculosis. The death rate for tuberculosis of the respiratory system has dropped from a maximum of 134.2 per 100,000 population in 1911 to a minimum of 27.7 in 1948. In this same period, the rate for the nonrespiratory forms has declined from a maximum of 20.9 in 1911 to a minimum of 2.3 in 1948. The percentage decrease in the death rate for the nonrespiratory forms (89 percent) has been greater than that for the respiratory forms over the same period (79 percent).

Table 3. *Number of deaths and death rates for tuberculosis of the respiratory system and for other forms, by race and sex: United States, 1948*

[Exclusive of deaths among armed forces overseas. Rates per 100,000 estimated midyear population in each specified group, excluding armed forces overseas]

Race and sex	Respiratory tuberculosis		Nonrespiratory tuberculosis	
	Number	Rate	Number	Rate
All races .....	40,420	27.7	3,413	2.3
Male .....	26,593	36.7	1,959	2.7
Female .....	13,827	18.8	1,454	2.0
White .....	29,541	22.6	2,209	1.7
Male .....	20,354	31.3	1,262	1.9
Female .....	9,187	14.0	947	1.4
Nonwhite .....	10,879	70.6	1,204	7.8
Male .....	6,239	82.8	697	9.3
Female .....	4,640	58.9	507	6.4

Of the total number of tuberculosis deaths registered during 1948, 40,420, or 92.2 percent, were attributed to respiratory tuberculosis, and 3,413, or 7.8 percent, to the nonrespiratory forms of the disease (table 3). The death rate for respiratory tuberculosis alone was 27.7 per 100,000 population, while the rate for all other forms was 2.3. For both respiratory and nonrespiratory tuberculosis, similar relationships are maintained for the race-sex groups, with mortality higher among males than among females, and among nonwhites than among whites.

The relative difference in the rates by sex is considerably greater for respiratory than for nonrespiratory forms of the disease. The respiratory tuberculosis death rate for males in 1948 was 36.7, twice as great as the rate of 18.8 for females. For nonrespiratory tuberculosis, the death rate for males was 2.7, which was 35 percent more than the rate of 2.0 for females.

While the frequency of deaths from nonrespiratory tuberculosis has reached a very low point among whites, it is still of importance in

Table 4. *Number of deaths and death rates for nonrespiratory tuberculosis by age, race, and sex: United States, 1940, 1947, and 1948*  
 [Exclusive of deaths among armed forces overseas. Rates per 100,000 estimated midyear population in each specified group, excluding armed forces overseas]

Year, race, and sex	NUMBER												
	Total deaths <sup>1</sup>	Under 1 year	1-4 years	5-14 years	15-24 years	25-34 years	35-44 years	45-54 years	55-64 years	65-74 years	75-84 years	85 years and over	Not stated
All races, both sexes:													
1948	3,413	190	538	209	345	442	455	396	383	310	121	23	1
1947	3,602	224	470	249	458	734	453	452	391	304	127	14	1
1940	4,852	278	594	436	712	734	609	608	440	307	118	11	5
Male:													
1948	1,959	90	283	106	173	220	267	267	257	204	70	11	1
1947	2,027	112	245	122	215	247	265	301	261	192	60	6	1
1940	2,650	148	318	239	342	378	350	361	271	171	66	4	2
Female:													
1948	1,454	100	255	103	172	212	188	129	126	106	51	12	—
1947	1,575	112	225	127	243	212	188	151	130	112	67	8	—
1940	2,202	130	276	197	370	356	259	247	169	136	52	7	3
White, both sexes:													
1948	2,209	110	370	138	168	224	255	261	288	268	106	20	1
1947	2,279	153	316	134	193	245	267	286	305	245	116	13	—
1940	3,323	185	406	270	381	428	405	408	383	274	112	10	1
Male:													
1948	1,262	47	193	67	83	106	156	178	188	173	62	8	1
1947	1,296	77	166	64	93	134	151	166	193	163	53	6	—
1940	1,831	96	211	148	179	219	246	278	240	147	62	4	1
Female:													
1948	947	63	177	71	85	118	99	83	100	95	44	12	—
1947	983	76	150	70	100	111	116	90	112	88	63	7	—
1940	1,492	89	195	122	202	209	159	190	143	127	50	6	—
Nonwhite, both sexes:													
1948	1,204	80	168	71	177	218	200	135	95	42	15	3	—
1947	1,323	71	154	115	265	214	186	166	86	53	11	1	—
1940	1,529	93	188	166	331	306	204	140	57	33	6	1	4
Male:													
1948	697	43	90	39	90	124	111	89	69	31	8	3	—
1947	731	35	79	58	122	113	114	105	68	29	7	—	1
1940	819	52	107	91	163	159	104	83	31	24	4	—	1
Female:													
1948	507	37	78	32	87	94	89	46	26	11	7	—	—
1947	592	36	75	57	143	101	72	61	18	24	4	1	—
1940	710	41	81	75	168	147	100	57	26	9	2	1	3

See footnote at end of table.

Table 4. Number of death and death rates for nonrespiratory tuberculosis by age, race, and sex: United States, 1940, 1947, and 1948—Continued

Year, race and sex	Total deaths <sup>1</sup>	Under 1 year	1-4 years	5-14 years	15-24 years	25-34 years	35-44 years	45-54 years	55-64 years	65-74 years	75-84 years	85 years and over	Not stated
RATE													
All races, both sexes:													
1948	2.3	5.9	4.5	0.9	1.5	1.9	2.2	2.3	2.9	4.1	4.0	5.2	
1947	2.5	6.4	4.2	1.1	2.0	2.0	2.3	2.7	3.1	4.1	4.4	3.2	
1940	3.7	13.7	6.9	1.9	3.0	3.4	3.3	3.9	4.1	4.8	5.1	2.9	
Male:													
1948	2.7	5.4	4.7	.9	1.5	2.1	2.7	3.2	3.9	5.6	5.1	5.8	
1947	2.8	6.2	4.3	1.1	1.9	2.2	2.7	3.6	4.1	5.4	4.5	3.2	
1940	4.0	14.4	7.3	2.1	2.9	3.6	3.8	4.5	5.0	5.4	6.0	2.5	
Female:													
1948	2.0	6.3	4.4	.9	1.5	1.8	1.8	1.5	1.9	2.7	3.1	4.7	
1947	2.2	6.5	4.1	1.1	2.1	1.8	1.8	1.8	2.1	3.0	4.3	3.2	
1940	3.3	13.1	6.6	1.8	3.1	3.3	2.8	3.3	3.2	4.3	4.3	3.3	
White, both sexes:													
1948	1.7	3.8	3.6	.7	.8	1.1	1.4	1.7	2.4	3.8	3.8	5.1	
1947	1.8	4.9	3.3	.7	1.0	1.2	1.5	1.9	2.6	3.7	4.3	3.3	
1940	2.8	10.4	5.4	1.4	1.8	2.2	2.5	3.3	3.9	4.6	5.2	3.0	
Male:													
1948	1.9	3.2	3.6	.6	.8	1.1	1.7	2.3	3.1	5.1	4.8	4.7	
1947	2.0	4.8	3.3	.6	.9	1.3	1.7	2.6	3.2	4.9	4.3	3.6	
1940	3.1	10.6	5.5	1.5	1.7	2.3	3.0	3.8	4.8	5.0	6.0	2.8	
Female:													
1948	1.4	4.5	3.5	.7	.8	1.1	1.1	1.1	1.7	2.6	2.9	5.4	
1947	1.5	5.0	3.2	.7	1.0	1.1	1.3	1.2	1.9	2.5	4.4	3.2	
1940	2.5	10.2	5.3	1.3	1.9	2.2	1.9	2.7	2.9	4.2	4.4	3.1	
Nonwhite, both sexes:													
1948	7.8	21.4	11.5	2.3	6.6	8.9	9.9	8.6	10.0	8.6	7.4	5.5	
1947	8.8	18.3	11.2	3.8	9.9	8.8	9.3	10.9	9.3	11.1	5.7	2.0	
1940	11.3	38.5	17.5	6.0	12.6	13.7	10.8	10.7	7.2	8.0	4.3	2.6	
Male:													
1948	9.3	22.9	12.3	2.5	6.8	10.8	11.6	11.7	14.3	12.3	8.2	13.6	
1947	9.9	18.0	11.5	3.8	9.3	10.0	12.0	14.1	14.4	11.7	7.6	0	
1940	12.3	43.4	20.0	6.6	13.1	15.0	11.3	12.4	7.4	11.2	6.0	0	
Female:													
1948	6.4	19.9	10.6	2.0	6.4	7.2	8.3	5.7	5.6	4.7	6.7	0	
1947	7.7	18.7	10.9	3.8	10.4	7.8	6.8	7.8	4.0	10.4	4.0	3.3	
1940	10.3	33.6	15.0	5.4	12.2	12.5	10.3	9.0	7.0	4.6	2.8	4.5	

<sup>1</sup> Includes deaths for which age was not stated.

the nonwhite population. In 1948, the death rate for nonrespiratory tuberculosis was 1.7 per 100,000 population for whites, whereas among nonwhites it was 7.8, more than four and one-half times as large. This race differential is greater than that seen for respiratory tuberculosis, where the death rate for nonwhites in 1948 is 70.6, a little over three times the rate of 22.6 for whites. The number of deaths and the death rates for nonrespiratory tuberculosis by age, race, and sex are shown for the United States for the years 1940, 1947, and 1948 in table.

Table 5 shows the number of deaths, the death rates and the percentage distribution of the various specific forms of tuberculosis for 1948. Although the deaths from nonrespiratory tuberculosis have constituted a smaller and smaller part of all tuberculosis deaths over the course of the years, the bulk of the nonrespiratory deaths are still

Table 5. *Number of deaths and death rates for tuberculosis by specified form: United States, 1948*

[Exclusive of deaths among armed forces overseas. Rates per 100,000 estimated midyear population in excluding armed forces overseas]

Cause of death	Number of deaths	Percent of total	Death rate
Tuberculosis (all forms).....	43,833	100.0	30.0
Tuberculosis of the respiratory system.....	40,420	92.2	27.7
Tuberculosis (other forms).....	3,413	7.8	2.3
Tuberculosis of the meninges and central nervous system.....	1,048	2.4	0.7
Tuberculosis of the intestines and peritoneum.....	382	0.9	0.3
Tuberculosis of the vertebral column.....	399	0.9	0.3
Tuberculosis of the bones and joints (except vertebral column).....	101	0.2	0.1
Tuberculosis of the skin and subcutaneous cellular tissue.....	18	(*)	(*)
Tuberculosis of the lymphatic system (except bronchial, mediastinal, mesenteric, and retroperitoneal lymph nodes).....	66	0.2	(*)
Tuberculosis of the genito-urinary system.....	327	0.7	0.2
Tuberculosis of other organs.....	101	0.2	0.1
Disseminated tuberculosis.....	971	2.2	0.7

\*Less than 0.05.

in the classifications of disseminated tuberculosis and tuberculosis of the meninges and central nervous system. In 1948, 28.5 percent were classified as disseminated tuberculosis and 30.7 percent as tuberculosis of the meninges and central nervous system. An additional third (32.5 percent), resulted from tuberculosis of the intestines and peritoneum, of the vertebral column, and of the genito-urinary system. In interpreting these figures, it is important to note that they represent only a part of the total number of deaths in which nonrespiratory involvement is mentioned on the death certificate. The problem of primary cause selection, and joint-cause classification which occurs when more than one cause of death is reported on the death certificate has been discussed in a previous paper (6).

## Tuberculosis Mortality Among Nonwhite Groups

Table 6 presents the number of deaths and the death rates for tuberculosis (all forms) from 1940 to 1948 for the nonwhite population and the principal race groups under the nonwhite classification.

The total number of deaths among nonwhites in 1948 was 12,083. Of these, 92.9 percent occurred among Negroes, 4.9 percent among Indians, and the remaining 2.2 percent among Chinese, Japanese, and other racial groups.

The tuberculosis death rate for all nonwhites in 1948 was 78.4 per 100,000 population. The rates for the several nonwhite race groups ranged from 58.0 and 76.3 for Japanese and Negroes to 143.2 and 166.7 for Indians and Chinese, respectively. The rate for Chinese was more than twice as high as that for Negroes, and six times as high as the rate for the white population. Beginning with 1945, the tuberculosis death rates for all the nonwhite race groups have presented a pattern of steady decrease, similar to that for the white race.

In interpreting the differences in the rates for the several nonwhite groups, a number of factors should be taken into consideration. These rates are based on estimated population figures, which for postcensal years, may contain errors that are relatively large for small population groups. The comparability of the death rates is further limited by differences in the age-sex composition of the population among the specified races, and the completeness with which deaths are registered. The 1940 enumeration of the population showed considerable variation

Table 6. *Number of deaths and death rates for tuberculosis (all forms) for nonwhites by specified race: United States, 1940-48*

Exclusive of deaths among armed forces overseas. Rates per 100,000 estimated midyear population in each specified group, excluding armed forces overseas]

Race and year	Number	Rate	Race and year	Number	Rate
<b>Nonwhite total:</b>			<b>Chinese:</b>		
1948.....	12,083	78.4	1948.....	145	166.7
1947.....	13,281	88.1	1947.....	165	191.9
1946.....	13,571	92.3	1946.....	215	265.4
1945.....	14,293	102.6	1945.....	210	287.7
1944.....	14,773	106.2	1944.....	229	309.5
1943.....	15,796	112.9	1943.....	224	290.9
1942.....	16,384	118.4	1942.....	199	258.4
1941.....	16,968	124.2	1941.....	203	263.6
1940.....	17,217	127.6	1940.....	208	266.7
<b>Negro:</b>			<b>Japanese:</b>		
1948.....	11,222	76.3	1948.....	76	58.0
1947.....	12,271	85.2	1947.....	92	71.9
1946.....	12,421	88.4	1946.....	98	79.7
1945.....	13,114	98.4	1945.....	116	101.8
1944.....	13,538	101.8	1944.....	128	105.8
1943.....	14,513	108.4	1943.....	138	112.2
1942.....	15,107	114.2	1942.....	142	117.4
1941.....	15,702	120.2	1941.....	137	112.3
1940.....	15,883	123.1	1940.....	144	113.4
<b>Indian:</b>			<b>Other:</b>		
1948.....	590	143.2	1948.....	50	73.5
1947.....	695	173.3	1947.....	58	96.7
1946.....	771	198.7	1946.....	66	120.0
1945.....	777	212.3	1945.....	76	138.2
1944.....	798	221.1	1944.....	80	148.1
1943.....	823	229.9	1943.....	98	184.9
1942.....	836	238.9	1942.....	100	196.1
1941.....	836	243.0	1941.....	90	180.0
1940.....	867	258.0	1940.....	115	230.0



in age distribution among the race groups. Furthermore, there was a marked preponderance of males among the Chinese and the "other nonwhite" groups. These age-sex distributions may have been changed somewhat by the increasing birth rate since 1940, and by selective migration. In addition, the death rates by race for the war years, computed for the population present in the country, were influenced by the changes in population composition resulting from the withdrawal of young men for duty with the armed forces overseas.

Quantitative data on the completeness with which deaths are registered are almost completely lacking. However, the indications afforded by extraordinarily low death rates recorded for some areas, and the results of a test of completeness of birth registration made in 1940, suggest that deaths of nonwhites are less completely registered than those of whites. Consequently, the recorded rates may be interpreted as a minimum statement of the seriousness of the tuberculosis problem among the nonwhite races.

### Death Rates by State

The rapid decline in the tuberculosis death rate for the United States since 1940 has been shared by all the States. For 11 States, the rates declined between 20 and 30 percent (table 7), from the 1939-41 average; for 21 States and the District of Columbia, between 30 and 40 percent; and for 16 States more than 40 percent. The States which have made the greatest progress include several which had very high, and several which had very low rates in 1939-41. Tennessee and Iowa each recorded a reduction of over 40 percent between 1939-41 and 1948. There seems to be no indication at present that the tuberculosis rate is leveling off, even for States with very low rates.

Except for Arizona with its high rate of 82.4, the rates for residents of the various States in 1948 ranged from 9.5 for Iowa to 53.1 per 100,000 population for New Mexico. Only six States, Arizona, New Mexico, Tennessee, Maryland, Kentucky, Nevada, and the District of Columbia now have rates of over 40. In 1939-41, the lowest rate was 15.5 (Utah) and the highest (again excepting Arizona) 78.5 for Tennessee.

The geographic distribution by States of the 1948 tuberculosis death rates is shown in figure 5. One-quarter of the States have rates which are below 20 per 100,000 population, and more than half have rates below 30. However, there has been little change in the relative rank of the States when they are arrayed in quartiles. The States having the 12 highest rates form a band that stretches across the Southwest along the southern border of the country to the Mississippi, and thence northeast through Tennessee, Kentucky, and Virginia, to include the District of Columbia, Maryland, Delaware, and New York. In general, the States in the third quartile are contiguous to those in the



Table 7. *Number of deaths from tuberculosis (all forms), death rates and percentage change in rates: United States and each State, 1939-41 average, 1947 and 1948*

[By place of residence. Exclusive of deaths among armed forces overseas. Rates per 100,000 estimated total midyear population present in area]

Area	Number			Rate			Percent- age change in rate
	1948	1947	1939-41 average	1948	1947	1939-41 average <sup>1</sup>	1939-41 to 1948
United States.....	43,833	48,064	60,429	30.0	33.5	45.8	-34.5
Alabama.....	1,022	1,147	1,518	35.2	40.5	53.7	-34.5
Arizona.....	580	644	724	82.4	100.0	141.9	-41.9
Arkansas.....	727	802	1,009	37.5	41.9	51.7	-27.5
California.....	3,301	3,455	3,838	31.9	35.2	54.5	-41.5
Colorado.....	362	375	503	30.2	32.8	44.5	-32.1
Connecticut.....	528	504	616	26.5	25.5	36.1	-26.6
Delaware.....	119	132	152	39.7	45.4	56.7	-30.0
District of Columbia.....	441	497	548	51.1	57.7	78.3	-34.7
Florida.....	745	793	944	30.7	34.1	49.0	-37.3
Georgia.....	1,002	1,054	1,510	31.6	33.6	48.0	-34.2
Idaho.....	70	71	99	11.9	13.5	19.0	-37.4
Illinois.....	2,658	2,842	3,663	31.8	33.8	46.5	-31.6
Indiana.....	917	1,083	1,398	23.4	28.2	40.6	-42.4
Iowa.....	249	307	450	9.5	11.8	17.8	-46.6
Kansas.....	252	322	423	13.3	16.7	23.4	-43.2
Kentucky.....	1,290	1,472	1,961	45.2	52.9	69.4	-34.9
Louisiana.....	947	986	1,347	36.5	38.8	56.4	-35.3
Maine.....	197	193	268	21.9	21.8	31.7	-30.9
Maryland.....	1,010	1,172	1,268	46.9	54.8	68.7	-31.7
Massachusetts.....	1,373	1,586	1,623	29.6	34.2	37.4	-20.9
Michigan.....	1,590	1,675	1,828	25.6	27.6	34.8	-26.4
Minnesota.....	492	579	758	16.8	20.0	27.2	-38.2
Mississippi.....	666	729	1,074	31.5	34.8	48.5	-35.1
Missouri.....	1,016	1,291	1,783	26.1	33.1	46.9	-44.3
Montana.....	146	152	235	28.6	31.1	42.3	-32.4
Nebraska.....	167	199	225	13.0	15.5	17.3	-24.9
Nevada.....	72	44	70	43.9	31.7	62.2	-29.4
New Hampshire.....	72	83	133	13.8	15.5	27.1	-49.1
New Jersey.....	1,393	1,555	1,852	29.2	33.6	44.6	-34.5
New Mexico.....	303	330	357	53.1	60.3	67.0	-20.7
New York.....	5,128	5,286	6,244	36.0	37.3	46.5	-22.6
North Carolina.....	949	1,128	1,598	25.0	30.5	44.4	-43.7
North Dakota.....	62	88	127	10.7	16.3	20.1	-46.8
Ohio.....	2,145	2,377	2,913	27.4	31.0	42.2	-35.1
Oklahoma.....	606	701	1,104	26.4	30.7	49.3	-46.5
Oregon.....	249	314	307	15.2	20.3	27.7	-45.1
Pennsylvania.....	3,076	3,467	4,231	29.4	33.0	42.8	-31.3
Rhode Island.....	199	233	265	26.7	31.3	37.5	-28.8
South Carolina.....	547	557	876	27.6	28.5	45.7	-39.6
South Dakota.....	113	167	197	18.5	28.9	31.2	-40.7
Tennessee.....	1,423	1,544	2,298	44.8	50.0	78.5	-42.9
Texas.....	2,634	2,791	3,814	35.7	39.3	59.1	-39.6
Utah.....	69	80	86	10.3	12.5	15.5	-33.5
Vermont.....	115	119	144	31.7	32.5	40.4	-21.5
Virginia.....	1,087	1,244	1,628	35.6	41.5	59.4	-40.1
Washington.....	598	592	689	24.3	25.1	39.2	-38.0
West Virginia.....	622	683	880	32.5	36.3	46.2	-29.7
Wisconsin.....	474	585	806	14.4	18.0	25.8	-44.2
Wyoming.....	30	34	45	10.5	12.8	17.5	-40.0

<sup>1</sup> Based on average 1939-41 population.

fourth. The lowest rates were found in the West North Central and in the northwest Mountain States.

Many factors must be considered in evaluating the differences in crude death rates among States, or in time trends for one State. The

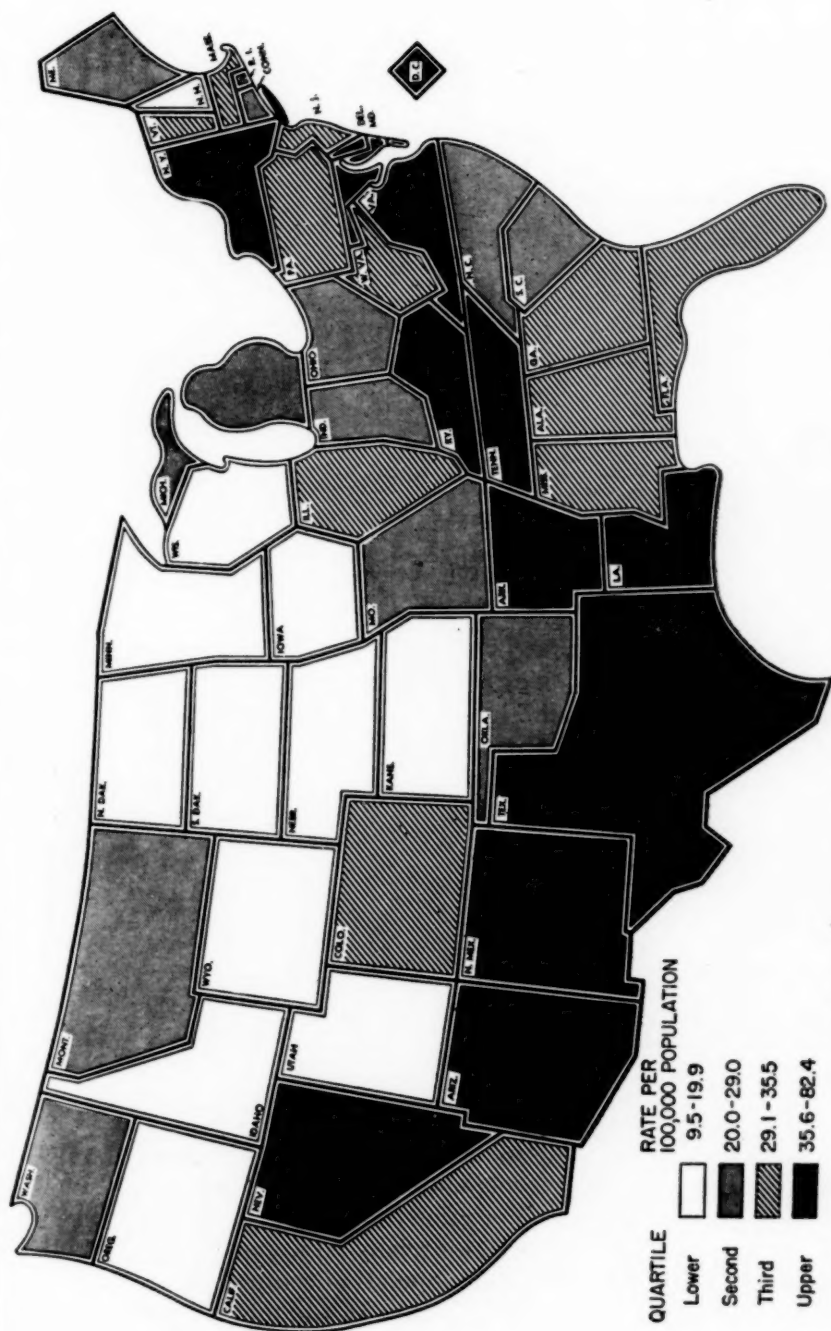


Figure 5. Death rates for tuberculosis (all forms) by State: United States, 1948.

Table 8. *Number of deaths from tuberculosis (all forms) by place of occurrence and by place of residence, and percentage difference: each State, 1948*

Area	Deaths recorded in area	Deaths of residents of area	Percentage difference
Alabama.....	1,009	1,022	+1.3
Arizona.....	673	580	-13.8
Arkansas.....	681	727	+6.8
California.....	3,309	3,301	-0.2
Colorado.....	420	362	-13.8
Connecticut.....	516	528	+2.3
Delaware.....	117	119	+1.7
District of Columbia.....	328	441	+34.5
Florida.....	727	745	+2.5
Georgia.....	970	1,002	+3.3
Idaho.....	65	70	+7.7
Illinois.....	2,613	2,658	+1.7
Indiana.....	898	917	+2.1
Iowa.....	239	249	+4.2
Kansas.....	242	252	+4.1
Kentucky.....	1,281	1,290	+0.7
Louisiana.....	993	947	-4.6
Maine.....	191	197	+3.1
Maryland.....	1,107	1,010	-8.8
Massachusetts.....	1,390	1,373	-1.2
Michigan.....	1,571	1,590	+1.2
Minnesota.....	507	492	-3.0
Mississippi.....	633	666	+5.2
Missouri.....	1,046	1,016	-2.9
Montana.....	133	146	+9.8
Nebraska.....	166	167	+0.6
Nevada.....	56	72	+28.6
New Hampshire.....	67	72	+7.5
New Jersey.....	1,358	1,393	+2.6
New Mexico.....	312	303	-2.9
New York.....	5,159	5,128	-0.6
North Carolina.....	999	949	-5.0
North Dakota.....	56	62	+10.7
Ohio.....	2,133	2,145	+0.6
Oklahoma.....	587	606	+3.2
Oregon.....	236	249	+5.5
Pennsylvania.....	3,083	3,076	-0.2
Rhode Island.....	200	199	-0.5
South Carolina.....	543	547	+0.7
South Dakota.....	122	118	-7.4
Tennessee.....	1,478	1,423	-3.7
Texas.....	2,600	2,634	+1.3
Utah.....	63	69	+9.5
Vermont.....	114	115	+0.9
Virginia.....	1,061	1,087	+2.5
Washington.....	612	598	-2.3
West Virginia.....	632	622	-1.6
Wisconsin.....	505	474	-6.1
Wyoming.....	32	30	-6.2

crude death rate makes no allowance for the differences in age, race, and sex composition of the population of the several States; or for changes produced in that composition from year to year through interstate migration, which has been especially large since 1940. All rates in postcensal years are based on population estimates. It should be noted that for several States, a change in the method of estimating State populations may account for part of the difference between the rates for 1947 and 1948. Additional factors which tend to limit the

comparability of State rates are the varying degree of completeness of death registration among the States, and differences in the completeness and accuracy of medical certification of death.

The rates for several States are also affected by selective migration of tuberculous persons. The percentage differences between the deaths occurring in an area, and the deaths of residents of an area, shown for 1948 in table 8, give some indication of the size of this movement. By definition, persons who remain in a State for 1 year or more are classified as residents of that State. Deaths in nonresident institutions (including tuberculosis sanatoria) follow the same rule. Thus the numbers of deaths by residence are adjusted for movements of less than one year's duration, but not for migrations of longer standing.

Table 9 shows, by States, the number of tuberculosis deaths (all forms), the number of respiratory tuberculosis deaths, the number and percent of nonrespiratory tuberculosis deaths, and the death rates for respiratory and nonrespiratory tuberculosis in 1948.

Because the number of deaths from nonrespiratory tuberculosis is small, differences in the death rates among States or from year to year for any State may not always reflect a change in mortality risk.

### Deaths in Institutions

Of the 40,420 deaths from respiratory tuberculosis in the United States in 1948, 68.6 percent occurred in institutions. This number is about 1 percent more than the proportion (67.9 percent) recorded in 1947, and reflects a continuation of the trend toward increased frequency of institutional deaths from this disease.

Table 10 shows, for the United States and each State, the number of deaths from respiratory tuberculosis which occurred outside of institutions and the number which occurred in institutions, by type of institution.

The 1948 proportions of respiratory tuberculosis deaths in institutions varied widely among the States, ranging from 27.0 percent for residents of Mississippi to 89.0 for those of Minnesota. The proportion of institutional deaths was lowest for residents of five southern States: Mississippi, Kentucky, Tennessee, Alabama, and Texas. For these areas, more than 59 percent of the deaths from respiratory tuberculosis occurred at home. The largest percentage of deaths in institutions (over 85 percent) was recorded for residents of the States of Washington, Michigan, Minnesota, New York and Wisconsin.

The data shown in table 10 can, if enough additional information is available, be useful in evaluating the adequacy of tuberculosis hospital facilities in an area. But it must be remembered that the data contain some serious limitations and therefore cannot be considered conclusive. For instance, the fact of the occurrence of a death in an insti-

**Table 9. Number of deaths and death rates for tuberculosis of the respiratory system and for other forms: United States and each State, 1948**

[By place of residence. Exclusive of deaths among armed forces overseas. Rates per 100,000 estimated total midyear population present in area]

Area	Tuberculosis (all forms)	Tuberculosis of respiratory system	Tuberculosis (other forms)		Rate per 100,000 population	
			Number	Percent of tuberculosis (all forms)	Tuberculosis of respiratory system	Tuberculosis (other forms)
United States.....	43,833	40,420	3,413	7.8	27.7	2.3
Alabama.....	1,022	937	85	8.3	32.3	2.9
Arizona.....	580	538	42	7.2	76.4	6.0
Arkansas.....	727	690	37	5.1	35.6	1.9
California.....	3,301	3,070	231	7.0	29.7	2.2
Colorado.....	362	335	27	7.5	27.9	2.3
Connecticut.....	528	488	40	7.6	24.5	2.0
Delaware.....	119	107	12	10.1	35.7	4.0
District of Columbia.....	441	376	65	14.7	43.6	7.5
Florida.....	745	713	32	4.3	29.3	1.3
Georgia.....	1,002	924	78	7.8	29.2	2.5
Idaho.....	70	62	8	11.4	10.6	1.4
Illinois.....	2,658	2,438	220	8.3	29.2	2.6
Indiana.....	917	817	100	10.9	20.9	2.6
Iowa.....	249	231	18	7.2	8.8	.7
Kansas.....	252	235	17	6.7	12.4	.9
Kentucky.....	1,290	1,186	104	8.1	41.5	3.6
Louisiana.....	947	894	53	5.6	34.5	2.0
Maine.....	197	178	19	9.6	19.8	2.1
Maryland.....	1,010	955	55	5.4	44.3	2.6
Massachusetts.....	1,373	1,277	96	7.0	27.5	2.1
Michigan.....	1,590	1,423	167	10.5	22.9	2.7
Minnesota.....	492	444	48	9.8	15.1	1.6
Mississippi.....	666	623	43	6.5	29.5	2.0
Missouri.....	1,016	950	66	6.5	24.4	1.7
Montana.....	146	136	10	6.8	26.6	2.0
Nebraska.....	167	152	15	9.0	11.8	1.2
Nevada.....	72	63	9	12.5	38.4	5.5
New Hampshire.....	72	62	10	13.9	11.9	1.9
New Jersey.....	1,393	1,299	94	6.7	27.2	2.0
New Mexico.....	303	269	34	11.2	47.1	6.0
New York.....	5,128	4,799	329	6.4	33.7	2.3
North Carolina.....	949	882	67	7.1	23.2	1.8
North Dakota.....	62	54	8	12.9	9.3	1.4
Ohio.....	2,145	1,953	192	9.0	24.9	2.4
Oklahoma.....	606	568	38	6.3	24.7	1.7
Oregon.....	249	225	24	9.6	13.7	1.5
Pennsylvania.....	3,076	2,793	283	9.2	26.7	2.7
Rhode Island.....	199	185	14	7.0	24.8	1.9
South Carolina.....	547	506	41	7.5	25.5	2.1
South Dakota.....	113	99	14	12.4	16.2	2.3
Tennessee.....	1,423	1,308	115	8.1	41.1	3.6
Texas.....	2,634	2,421	213	8.1	32.8	2.9
Utah.....	69	59	10	14.5	8.8	1.5
Vermont.....	115	109	6	5.2	30.0	1.7
Virginia.....	1,087	999	88	8.1	32.7	2.9
Washington.....	598	541	57	9.5	22.0	2.3
West Virginia.....	622	585	37	5.9	30.6	1.9
Wisconsin.....	474	440	34	7.2	13.3	1.0
Wyoming.....	30	22	8	26.7	7.7	2.8

tution is not evidence that the decedent was hospitalized for any significant period of time. As a matter of fact a 10-percent sample of deaths, taken in 1945, showed that approximately 20 percent of

Table 10. *Number of deaths from respiratory tuberculosis in institutions, by type of institution: United States and each State, 1948*

[By place of residence. \*Exclusive of deaths among armed forces overseas]

Area	Total	Deaths not in institutions	Deaths in institutions	Type of institution			
				General hospital	Tuberculosis hospital	Nervous and mental hospitals	Other and unknown institutions
United States.....	40,420	12,702	27,718	11,096	12,019	3,546	1,057
Alabama.....	937	572	365	126	180	47	12
Arizona.....	538	213	325	216	83	12	14
Arkansas.....	690	351	339	81	217	40	1
California.....	3,070	487	2,583	1,544	713	223	103
Colorado.....	335	79	256	158	68	15	15
Connecticut.....	488	110	378	107	165	56	50
Delaware.....	107	30	77	23	50	3	1
District of Columbia.....	376	57	319	193	112	14	-----
Florida.....	713	186	527	174	280	37	36
Georgia.....	9,924	456	468	123	214	124	7
Idaho.....	62	27	35	15	6	6	8
Illinois.....	2,438	409	2,029	845	869	285	30
Indiana.....	817	310	507	166	237	82	22
Iowa.....	231	51	180	39	86	47	8
Kansas.....	235	79	156	46	81	25	4
Kentucky.....	1,186	803	383	108	193	67	15
Louisiana.....	894	397	497	309	106	63	19
Maine.....	178	54	124	43	63	17	1
Maryland.....	955	302	653	260	328	51	14
Massachusetts.....	1,277	205	1,072	323	555	151	43
Michigan.....	1,423	183	1,240	386	644	102	108
Minnesota.....	444	49	395	122	192	76	5
Mississippi.....	623	455	168	55	56	47	10
Missouri.....	950	279	671	279	338	39	15
Montana.....	136	51	85	44	33	5	3
Nebraska.....	152	35	117	44	38	31	4
Nevada.....	63	17	46	36	10	-----	-----
New Hampshire.....	62	13	49	8	32	5	4
New Jersey.....	1,299	198	1,101	286	613	178	24
New Mexico.....	269	114	155	96	52	6	1
New York.....	4,799	644	4,155	1,952	1,593	464	146
North Carolina.....	882	328	554	77	360	106	11
North Dakota.....	54	9	45	8	25	10	2
Ohio.....	1,953	563	1,390	538	672	137	43
Oklahoma.....	568	275	293	86	131	66	10
Oregon.....	225	41	184	53	81	39	11
Pennsylvania.....	2,793	814	1,979	944	631	278	126
Rhode Island.....	185	41	144	27	58	33	26
South Carolina.....	506	157	349	37	243	68	1
South Dakota.....	99	31	68	28	30	10	-----
Tennessee.....	1,308	844	464	142	243	66	13
Texas.....	2,421	1,439	982	395	420	134	33
Utah.....	59	21	38	18	20	-----	-----
Vermont.....	109	39	70	18	39	13	-----
Virginia.....	999	460	539	199	236	80	24
Washington.....	541	65	476	162	225	73	16
West Virginia.....	585	288	297	57	163	72	5
Wisconsin.....	440	59	381	93	232	43	13
Wyoming.....	22	12	10	7	3	-----	-----

the persons who died of respiratory tuberculosis in institutions were hospitalized less than 2 weeks; about 50 percent were hospitalized less than 2 months (4). By the same token, neither is the occurrence of



a death outside of an institution evidence that the decedent was never hospitalized.

With these reservations in mind, however, it is obvious that the larger the proportion of tuberculosis deaths which occur in hospitals, the smaller the likelihood of the disease's spread in the community.

The distribution of deaths by type of institution is substantially the same for the United States as a whole in 1948 as it was in 1947. In some States the percentage distributions for these two years show marked differences. However, since the reasons for the differences are in most cases inherent in the nature of the policies and facilities of the individual States, no detailed analysis of the variation will be discussed here.

### Population Data

All death rates presented in this report have been computed on the basis of midyear population estimates provided by the Bureau of the Census. For 1900-1939, the population estimates for the United States by age, race, and sex, have been published in "Vital Statistics Rates in the United States, 1900-1940." The total figures for the United States have been made available in "Current Population Reports, Population Estimates" Series P-25, No. 27 for 1940-48. The United States estimates by age, race, and sex are published for 1940-45 in "Population-Special Reports," Series P-47, No. 3; for 1946, in "Current Population Reports, Population Estimates," Series P-25, No. 21; and for 1947 and 1948, in Series P-25, No. 39. The estimates of the population in the age groups 75-84, and 85 and over, for 1940-48, and the estimates for the specific nonwhite race groups have not been published.

The State population estimates are shown in "Current Population Reports, Population Estimates," Series P-25, No. 12 for 1940-47 and for 1948 in Series P-25, No. 26.

### Summary

This report, the seventh of an annual series, presents data on deaths and death rates for tuberculosis in the United States and in each State for 1948, 1947, and for the prewar period, 1939-41. The trend of the death rates by age is discussed for the 21-year period, 1928-48.

There were 43,833 deaths from tuberculosis (all forms) in the United States in 1948. The death rate was 30.0 per 100,000 population, which was 10 percent below the rate of 33.5 for 1947. The death rates for both sexes in the white and nonwhite population groups have continued their decline, with the rates for females falling faster than those for males. The 1948 rates were 33.3 for white males, 15.4 for white females, 92.1 for nonwhite males and 65.4 for nonwhite females.



The rates for the principal nonwhite groups ranged from 58.0 and 76.3 for Japanese and Negroes to 143.2 and 166.7 for Indians and Chinese.

Of the total deaths from tuberculosis in 1948, 92.2 percent were from tuberculosis of the respiratory system and 7.8 percent from the non-respiratory forms of the disease. The rate for respiratory tuberculosis was 27.7, and for all other forms, 2.3.

The death rates for tuberculosis (all forms) by State of residence, ranged from 9.5 for Iowa to 53.1 for New Mexico, and 82.4 for Arizona.

In 1948, the proportion of respiratory tuberculosis deaths which occurred in institutions was 68.6 percent for the United States. The lowest proportion (27.0 percent) was found in Mississippi, while the highest (89.0 percent), was in Minnesota.

When the respiratory rates for the past 21 years are examined by age, race, and sex, it is found that the largest relative declines occurred among children. Smaller declines have taken place up to age 65. Beyond this age, however, small but consistent increases are apparent in the death rates for both white and nonwhite males beginning with 1941. On the other hand, the rates for females over 65 have continued to decline.

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## ANNOUNCEMENT

### Courses in Laboratory Diagnosis of Tuberculosis

A 1-week course for laboratory directors, senior staff members, and physicians in the laboratory diagnosis of tuberculosis will be given June 5-9, 1950, at the Laboratory Services of the Communicable Disease Center. In addition, a 3-week course for laboratory personnel in the laboratory diagnosis of tuberculosis will be offered August 21 to September 8, and a 2-week course from December 4-15.

*Tentative outline for the 1-week course.*—Demonstrations, lectures and round-table discussions, supplemented by laboratory exercises.

- |  |        |
|--|--------|
| 1. The role of the laboratory in tuberculosis control..... |        |
| 2. Safety measures in tuberculosis laboratories.....       |        |
| 3. Preparation of culture media.....                       |        |
| 4. Techniques of microscopy.....                           |        |
| 5. Interpretation of results and reporting.....            | 1 day. |
| 6. Culture technique.....                                  |        |
| 7. Digestion and concentration.....                        | 1 day. |
| 8. Diagnosis by cultural methods.....                      |        |
| 9. Animal inoculations and autopsies.....                  | 1 day. |
| 10. Assays of chemotherapeutic drugs.....                  |        |
| 11. Studies on evaluation methods.....                     | 1 day. |
| 12. Administration of a tuberculosis laboratory.....       |        |

*Tentative outline for the 3-week course.*—Practical laboratory training, supplemented by lectures and demonstrations.

- |   |         |
|---|---------|
| 1. The role of the laboratory in tuberculosis control.....  |         |
| 2. Safety measures in tuberculosis laboratories.....  |         |
| 3. Preparation of culture media: Practice in making the commonly used diagnostic and research media.....  | 2 days. |
| 4. Microscopic techniques: Training in preparation of smears and stains. Interpretation of findings. Fluorescent microscopy.....  |         |
| 5. Lecture on biochemistry of tuberculosis.....   |         |
| 6. Lecture on BCG.....  | 2 days. |
| 7. Culture techniques: Training in preparation of cultures. Digestion and concentration methods. Particular emphasis on interpretation of findings. Includes training in identification of types of mycobacteria and their colony morphology..... | 8 days. |
| 8. Lecture on studies on evaluation methods.....  |         |
| 9. Lecture on serology of tuberculosis.....   |         |
| 10. Lecture on clinico-chemical tests in tuberculosis.....  |         |
| 11. Animal inoculations: Training in techniques of inoculation and autopsy of mice, guinea pigs and rabbits. Tuberculin testing of animals.....   |         |
| 12. Lecture on vole bacillus.....   | 3 days. |
| 13. Lecture on use of chick embryos in the diagnosis of tuberculosis.....   |         |
| 14. Lectures on the use of various animals in the diagnosis of tuberculosis.....  |         |

Information and applications should be obtained well in advance from the Chief, Laboratory Services, Communicable Disease Center, Public Health Service, Chamblee, Ga.

# INCIDENCE OF DISEASE

*No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring*

## UNITED STATES

### REPORTS FROM STATES FOR WEEK ENDED MARCH 18, 1950

For the current week in the Nation, reported cases of influenza increased from 27,045 to 29,036. For the corresponding week last year, 3,780 cases were reported. The 5-year (1945-49) median is 4,054. The cumulative total for 11 weeks of the calendar year is 144,982 as compared with the corresponding total of 49,087 for 1949 and 169,936 for 1946, the highest year during the last 5 years.

Relatively large increases for the current week over the previous week were reported in Arkansas (788 to 1,465), District of Columbia (0 to 30), Indiana (1 to 71), Kansas (71 to 316), Kentucky (13 to 91), Maryland (19 to 61), New Mexico (1 to 58), New Jersey (8 to 24), and New York (19 to 49).

Increases for the current week over the preceding week occurred in 6 of the 9 geographic divisions, and ranged from 5 cases of influenza (3 to 8) in the New England to 2,019 (9,334 to 11,353) in the South Atlantic. The West South Central decreased from 13,989 to 13,656 cases, and the Mountain and Pacific decreased from 1,833 to 997 and from 60 to 54, respectively.

The 10 highest States and the number of cases reported are: Texas, 10,530; Virginia, 7,859; West Virginia, 2,654; Oklahoma, 1,654; Arkansas, 1,465; Tennessee, 864; Alabama, 816; South Carolina, 407; Georgia, 330; and Kansas, 316. The total cases reported by these 10 States is 26,895. Among the other States, 8 reported no cases and 2 reported 1 case each.

For the third successive week, total deaths reported in major cities were slightly above normal. The small increase in deaths is probably due in part to the increase in influenza and pneumonia. Reports of influenza and pneumonia deaths in these same cities are incomplete for the current week and the preceding week, but beginning with the week ended March 4, deaths from these two causes increased by 133 (352 to 485) over the preceding week.

Increases over the previous week are noted in reported cases of the following diseases which are also above the 5-year median: infectious encephalitis (9 to 17), meningococcal meningitis (103 to 111), and whooping cough (2,807 to 2,867). One case of anthrax and one case of psittacosis were reported in New York.

# Telegraphic case reports from State health officers for the week ended March 18, 1950

[Leaders indicate that no cases were reported]

Division and State	Diphtheria	Encephalitis, infectious	Influenza	Measles	Meningitis, meningococcal	Pneumonia	Polio-myelitis	Rocky Mt. spotted fever	Scarlet fever	Small-pox	Tularemia	Typhoid and paratyphoid fever	Whooping cough	Rabies in animals
NEW ENGLAND														
Maine.....			1	44		15			12				32	
New Hampshire.....						1			2				3	
Vermont.....				26					1				17	
Massachusetts.....	3			282	3				140			4	194	
Rhode Island.....		4		5					11				41	
Connecticut.....		3		25	2	68	1		29				120	
MIDDLE ATLANTIC														
New York.....	5	7	349	979	9	401	8		3 156			3	187	16
New Jersey.....	1	1	24	966	5	126			56			1	144	
Pennsylvania.....	5			389	3	99			134			4	225	1
EAST NORTH CENTRAL														
Ohio.....	5		13	160	2	46	1		261			1	201	8
Indiana.....	4		71	467	1	22	2		130			1	48	422
Illinois.....			4	219	4	102			66			1	93	3
Michigan.....	3	2	7	1,884	4	79	4		141		1	1	306	2
Wisconsin.....	1		284	492	1	24			92			1	113	
WEST NORTH CENTRAL														
Minnesota.....	3		16	54	5	66			32				29	
Iowa.....			233	565	2	6			14				18	3
Missouri.....	2		11	11	1	4			18				14	
North Dakota.....	1	1	17	14		6	3		1			1		
South Dakota.....	3		41	41		1	1		1			1		
Nebraska.....	2		45	115		17			31				5	
Kansas.....	1	1	316	37	1	21			25				25	
SOUTH ATLANTIC														
Delaware.....	1			27	2		1		10				6	
Maryland.....	4		61	43	1	57			34				44	
District of Columbia.....			30	100		16			5				1	
Virginia.....	7		7,859	83	7	245			25		1	2	41	2
West Virginia.....	6		2,054	387	2	48	1		12				39	7
North Carolina.....	7			274	2				34			1	85	

South Carolina.....	3	407	73	1	18	3	16	9
Georgia.....	2	330	341	1	11	10		

April 7, 1950

South Carolina	3	407	73	1	18	2	3	5	16	9
Georgia	2	330	341	1	11		10		41	8
Florida	4	12	128	4	15		4		5	
EAST SOUTH CENTRAL										
Kentucky	8	91	59	10	53	7	28	2	58	23
Tennessee	12	864	133	2	147	1	22	1	45	11
Alabama	5	816	63	1	46	1	14	3	38	10
Mississippi	5	104	105	2			4	1	4	6
WEST SOUTH CENTRAL										
Arkansas	3	1,465	76	1	122	3	7	2	41	5
Louisiana	4	7	35	3	55	3	6	1	3	5
Oklahoma	6	1,654	19	2	785	24	21	3	31	5
Texas	28	10,580	433	13			37	3	186	34
MOUNTAIN										
Montana		283	89	1			8	2	4	
Idaho		272	6		13	2	19		87	
Wyoming			13				7			
Colorado		138	73		32		6	2	23	7
New Mexico	2	58	38		24	1	6		19	
Arizona	1	233	134		20	1	12	2	56	
Utah		12	191		5		2		46	
Nevada		1	16		1					
PACIFIC										
Washington	1	5	65	2	4		63		28	
Oregon		36	25		23		22		49	
California	5	13	327	11	59	6	105	1	56	1
Total	153	29,036	10,119	111	3,021	73	1,880	18	2,867	183
Median, 1945-49	262	4,084	22,266	99		36	3,236	14	2,299	
Year to date, 11 weeks	1,786	144,982	74,201	997	27,562	1,137	19,580	254	28,134	1,656
Median, 1945-49	3,233	105,579	152,241	940		467	31,256	485	24,659	
Seasonal low week ends	(27th)	(30th)	(35th)	(37th)		(11th)	(32d)	(11th)	(39th)	
Since seasonal low week	July 9	July 30	Sept. 3	Sept. 17		Mar. 19	Aug. 13	Mar. 19	Oct. 1	
Median, 1944-45 to 1948-49	10,799	175,512	43,331	1,910		42,619	36,019	3,883	49,670	
		138,554	178,365	1,905		19,403	56,560	4,013	48,185	

\* Including cases reported as salmonellosis.

\* New York City only.

\* Including cases reported as streptococcal sore throat.

\* Reported for 2 weeks.

\* Deduction: Georgia, weeks ended Jan. 21 and 28, 1 case each.

Author: New York, 1 case.

Pittsboro: New York, 1 case.

Alaska: Influenza 49, whooping cough 5.

Hawaii: Diphtheria 1, poliomyelitis 1.

## TERRITORIES AND POSSESSIONS

### Puerto Rico

*Notifiable diseases—4 weeks ended January 28, 1950.*—During the 4 weeks ended January 28, 1950, cases of certain notifiable diseases were reported in Puerto Rico as follows:

Disease	Cases	Disease	Cases
Chickenpox.....	49	Tetanus, infantile.....	3
Diphtheria.....	28	Tuberculosis (all forms).....	289
Dysentery.....	1	Typhoid fever.....	10
Influenza.....	102	Typhus fever (murine).....	1
Malaria.....	8	Venereal diseases:	
Measles.....	3	Gonorrhea.....	67
Poliomyelitis.....	5	Syphilis.....	9
Tetanus.....	12	Whooping cough.....	319

## FOREIGN REPORTS

### CANADA

*Provinces—Notifiable diseases—Week ended March 4, 1950.*—During the week ended March 4, 1950, cases of certain notifiable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	New-found-land	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox.....			24	2	265	326	37	18	45	130	847
Diphtheria.....					4					2	6
Dysentery:											
Amebic.....										1	1
Bacillary.....						4	1			1	10
German measles.....			61		3	650		27	251	491	1,483
Influenza.....			26			18	10			2	56
Measles.....	1		10	5	397	630	20	9	23	162	1,257
Meningitis, meningococcal.....											
Mumps.....			122	1	132	683	13	37	105	508	1,601
Poliomyelitis.....					1					1	2
Scarlet fever.....	2		6		77	57	3	1	53	8	207
Tuberculosis (all forms).....	34		4	11	102	16	11	4	6	22	210
Typhoid and paratyphoid fever.....					9					1	10
Undulant fever.....					4		2	1			7
Venereal diseases:											
Gonorrhea.....	4		8	12	91	41	17	18	23	43	257
Syphilis.....	13			9	65	25	5	8		11	136
Other forms.....										1	1
Whooping cough.....	1		14		59	54	1	1	1	12	143



## EGYPT

*Cerebrospinal meningitis*.—Information has been received that 79 cases of cerebrospinal meningitis, with 7 deaths, were reported in Cairo during the period February 26–March 4, 1950. During the preceding week, 66 cases with 15 deaths were reported. The 7-year (1942–48) median for Egypt for the second 4-week period was 14 (in 1948), and for the third 4-week period 13 (in 1946). The maximum for each of these periods was 38 and 33, respectively (in 1942).

## GERMANY

*Q fever*.—On February 8, 1950, information was received that German health agencies reported 90 cases of Q fever in Zusenhausen, a locality of about 1,500 population near Heidelberg.

## JAPAN

*Influenza*.—According to information received March 1, 1950, 2,327 cases of influenza occurred in Japan during the period February 12–18, a decrease of 15 percent from the number of cases reported during the preceding week. Information received March 9 stated that 1,764 cases were reported during the week ended February 25.

## MADAGASCAR

*Notifiable diseases—January 1950*.—Notifiable diseases were reported in Madagascar and Comoro Islands during January 1950 as follows:

Disease	Aliens		Natives	
	Cases	Deaths	Cases	Deaths
Beriberi.....			1	
Bilharziasis.....	1		49	3
Diphtheria.....	1		8	1
Dysentery:				
Amebic.....	10		562	7
Bacillary.....			25	10
Erysipelas.....			21	1
Influenza.....	20		1,559	82
Leprosy.....			44	
Malaria.....	356	4	46,879	292
Measles.....			260	3
Meningitis, meningococcal.....	1			
Mumps.....	2		174	
Plague.....			15	15
Pneumonia:				
Broncho.....			698	102
Pneumococcic.....	3		585	75
Puerperal infection.....			2	1
Relapsing fever.....	1			
Tuberculosis, pulmonary.....	2		166	20
Typhoid fever.....	3		24	7
Whooping cough.....	6		396	13

## NORWAY

*Notifiable diseases—December 1949.*—During the month of December 1949, cases of certain notifiable diseases were reported in Norway as follows:

Disease	Cases	Disease	Cases
Diphtheria.....	20	Paratyphoid fever.....	13
Dysentery, unspecified.....	3	Pneumonia (all forms).....	3,565
Encephalitis, epidemic.....	6	Poliomyelitis.....	12
Erysipelas.....	399	Rheumatic fever.....	89
Gastroenteritis.....	2,475	Scabies.....	1,656
Hepatitis, epidemic.....	95	Scarlet fever.....	282
Impetigo contagiosa.....	2,123	Tuberculosis (all forms).....	347
Influenza.....	3,858	Typhoid fever.....	2
Laryngitis.....	13,021	Veneral diseases:	
Malaria.....	6	Gonorrhea.....	179
Measles.....	1,171	Syphilis.....	62
Meningitis, meningococcal.....	7	Weil's disease.....	1
Mumps.....	182	Whooping cough.....	4,103

<sup>1</sup> Includes 2 cases salmonellosis.

## REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

*Note.*—The following reports include only items of unusual incidence or of special interest and the occurrence of these diseases, except yellow fever, in localities which had not recently reported cases. All reports of yellow fever are published currently.

A table showing the accumulated figures for these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

### Cholera

*India.*—During the week ended March 11, 1950, 199 cases of cholera, with 62 deaths, were reported in Calcutta.

*Indochina (French)—Cochinchina.*—During the week ended March 4, 1950, 1 fatal case of cholera was reported in Rachgia, Cochinchina.

*Pakistan.*—During the week ended February 25, 1950, 2 fatal cases of cholera were reported in Dacca. During the week ended March 4, 4 cases of this disease, with 3 deaths, were reported in Chittagong.

### Plague

*Belgian Congo.*—Plague has been reported in Belgian Congo as follows: On February 20, 1950, one fatal case in the village of Kwan-druma, northeast of Blukwa, Stanleyville Province; on February 22, one fatal case in Butakonda, a village northeast of Lubero, Costermansville Province.

*Burma.*—During the week ended January 7, 1950, 8 cases of plague with 7 deaths were reported in Yenangyaung, and 2 cases with 1 death were reported in that port during the week ended January 14. During the week ended January 28, 1 fatal case was reported in the port of Bhamo.

*China.*—Plague has been reported in China as follows: November 1-30, 1949, 10 deaths in Wenchow, Chekiang Province; December 1-31, 1949, 28 deaths in Fukien Province; December 1-19, 1949, 16 cases, 13 deaths in Kiangsi Province; February 2-4, 1950, 4 deaths in Wenchow, Chekiang Province; February 1-7, 1950, 9 cases, 4 deaths, in Kuan-tien Village, Sui-chi District, Kwangtung Province. Information dated March 1, 1950, stated that 63 deaths from plague had been reported in Katou and Paktam, two small towns in the area of Onpo in Kwangsi Province.

*Indochina.*—Plague has been reported in Indochina as follows: Week ended February 18, 1950, 4 cases, 1 death—1 case, 1 death in the rural area of Pnompenh, Cambodia, 3 cases in Phanthiet, Annam; week ended February 25, 6 cases, 1 death—1 case, 1 death in Pakse, Laos, 5 cases in Phanthiet, Annam; week ended March 4, 3 cases in Phanthiet; week ended March 11, 4 cases in Phanthiet.

*Siam (Thailand).*—During the week ended February 18, 1950, 15 cases of plague with 3 deaths were reported in Siam, including 10 cases 1 death in Nakhon Rajsima Province. Four cases with 1 death were reported in Siam during the week ended February 25.

*Union of South Africa—Orange Free State.*—During the week ended January 21, 1950, 1 fatal suspected case of plague was reported in Bothaville District. Orange Free State.

#### Smallpox

*Afghanistan.*—During the month of January 1950, 61 cases of smallpox were reported in Afghanistan.

*Burma.*—During the period January 1-February 18, 1950, 2,720 cases of smallpox, with 939 deaths, were reported in Burma. For the week ended February 25, 245 cases, 92 deaths were reported, and 286 cases with 116 deaths were reported during the week ended March 4.

*Cameroon (British).*—During the week ended February 4, 1950, 203 cases of smallpox, with 66 deaths, were reported in British Cameroon.

*China.*—Smallpox has been reported in China as follows: December 1, 1949 to January 20, 1950, 107 cases in the Wuchang-Hankow area, Hupeh Province; February 11-20, 1950, 26 cases, 12 deaths, in Swatow; week ended March 11, 1950, 21 cases in Shanghai.

*French West Africa.*—For the period February 11-20, 1950, 158 cases of smallpox were reported in French West Africa, including 48 cases in Ivory Coast, 73 cases in Niger Territory, and 16 cases in French Sudan.

*India.*—For the week ended March 11, 1950, 497 cases of smallpox were reported in Calcutta, and 179 cases were reported in Madras.

### Typhus Fever

*Afghanistan.*—During the period January 1–23, 1950, 67 cases of typhus fever were reported in Afghanistan.

*Germany.*—During the week ended February 4, 1950, 1 case of typhus fever was reported in the Province of Westphalia, and during the week ended February 11, 1 case (murine type) was reported in Hamburg. Both of these localities are in the British Zone. One case was reported during the week ended February 18, and 1 case during the week ended February 25, at Reinickendorf in the French Sector of Berlin.

*Italy—Sicily.*—During the month of November 1949, 17 cases of typhus fever were reported in Sicily.

*Japan.*—Thirty-four cases of typhus fever were reported in Tokyo, and 5 cases in Yokohama, during the week ended March 4, 1950.

*Madagascar.*—During the month of January 1950, 1 fatal case of typhus fever (murine type) was reported in Tamatave.

### Yellow Fever

*Gold Coast.*—Yellow fever has been reported in the Oda Area of Gold Coast as follows: On January 1, 1950, 1 case, confirmed, at Atiankama; on February 16, 1 suspected case, on February 18, 1 suspected case, on February 21, 1 suspected case, all at Akwatia.

### DEATHS DURING WEEK ENDED MARCH 18, 1950

	Week ended Mar. 18, 1950	Correspond- ing week, 1949
Data for 93 large cities of the United States:		
Total deaths.....	10,547	9,723
Median for 3 prior years.....	9,975	
Total deaths, first 11 weeks of year.....	107,538	107,784
Deaths under 1 year of age.....	616	669
Median for 3 prior years.....	669	
Deaths under 1 year of age, first 11 weeks of year.....	6,811	7,292
Data from industrial insurance companies:		
Policies in force.....	69,832,790	70,543,550
Number of death claims.....	12,834	13,535
Death claims per 1,000 policies in force, annual rate.....	9.6	10.0
Death claims per 1,000 policies, first 11 weeks of year, annual rate.....	9.8	9.8

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It contains (1) current information regarding the incidence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

The PUBLIC HEALTH REPORTS is published primarily for distribution, in accordance with the law, to health officers, members of boards or departments of health, and other persons directly or indirectly engaged in public health work. Articles of special interest are issued as reprints or as supplements, in which forms they are made available for more economical and general distribution.

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